



# Swiss Young Physicists' Tournament 2019

FHNW Brugg-Windisch  
23/24 March 2019



## Swiss Young Physicists' Tournament

Where tomorrow's scientists meet.

---

### Welcome to the SYPT 2019

Dear participants, teachers and jurors

Another year, another host. We look forward to organising the **Swiss Young Physicists' Tournament 2019** at the *Fachhochschule Nordwestschweiz* (FHNW) in Brugg-Windisch. The FHNW proved to be an excellent venue for the SYPT's little sister, the SYNT in 2017, so we are very confident that with its modern infrastructure it will be perfectly suited for the tournament.

Once again we are expecting the impressive number of 25 teams of three students from all across Switzerland, the maximum number we can handle. They have all spent a lot of time designing experiments, collecting data and learning about the theory for one of the **17 IYPT problems**. They all look forward to presenting their solutions and to trying to qualify for the Swiss IYPT team.

Hosting more than one hundred students, jurors and staff is only possible thanks to the financial contributions from our supporters, but also thanks to the voluntary work of many helpers.

It is my great pleasure to welcome you all to an exciting weekend in Brugg-Windisch!



Samuel Byland (samuel.byland@sypt.ch), President Pro IYPT-CH

Visit [www.sypt.ch](http://www.sypt.ch) for the latest information on the SYPT 2019.



## Table of Contents

IYPT . . . . .	4
Pro IYPT-CH . . . . .	4
Agenda . . . . .	5
Problems for the SYPT/IYPT 2019 . . . . .	6
Fight Plan . . . . .	7
Regulations . . . . .	10
Rankings, Team Qualification and Awards. . . . .	15



## Swiss Young Physicists' Tournament

Where tomorrow's scientists meet.

---

### IYPT

The **International Young Physicists' Tournament** (IYPT, see [www.iypt.org](http://www.iypt.org)), sometimes also referred to as „Physics World Cup“, is a scientific competition among secondary school students interested in physics. A so-called **Physics Fights** lines up three teams of five students each. They in turn present and discuss their solutions to one of the problems, criticise the opponent's solution and review the performances of the other teams. All three teams get scores from a jury.

The **problems** are published a year before the tournament. They are chosen such that no single correct solution exists. Each presentation will show different aspects of the problem. Careful preparation and creativity in solutions are as important for creating a good impression, as are correct school physics and mathematics.

In **preparing** for the IYPT students do not just learn how to tackle difficult physics problems, but also how to work in a **team**, use computers to **collect and analyse data**, **present** scientific results and **debate**. The Physics Fights are **in English**, helping the students prepare for their future at university where an increasing number of lectures and seminars are held in English.

### Pro IYPT-CH

The **aim** of Pro IYPT-CH is that of making the idea behind the IYPT better known in Switzerland. It provides support for students and teachers in preparing problems and organises the selection of the Swiss team for the international tournament.

Since the first participation of Switzerland in the IYPT (2002) the number of students, teachers and schools participating has increased steadily. In 2005 Pro IYPT-CH organised the International Young Physicists' Tournament in Switzerland (Winterthur). This will be the eighth **national tournament** modelled on the international archetype.

If you would like to support Pro IYPT-CH and the SYPT and would like to be informed about our activities, you are very welcome to **become a member**. We also appreciate the help of former participants during the preparation for the SYPT and IYPT. Please contact Lioba Heimbach (see below) to get more information about membership or register online ([www.sypt.ch](http://www.sypt.ch)).

**President:** Samuel Byland ([president@sypt.ch](mailto:president@sypt.ch))

**Members:** Lioba Heimbach ([members@sypt.ch](mailto:members@sypt.ch))

**Website:** [www.sypt.ch](http://www.sypt.ch)

## Agenda of the SYPT 2019

**Date:** Saturday/Sunday, 23/24 March 2019

**Venue:** Fachhochschule Nordwestschweiz, Campus Brugg-Windisch, Bahnhofstrasse 6, 5210 Windisch

**Fees:** Participation at the SYPT is **free**. Lunch (Saturday and Sunday) and dinner (Saturday) are offered by the organiser. Train tickets (half-fare) can be reimbursed via our website ([www.sypt.ch](http://www.sypt.ch)) within two weeks after the tournament.

### Saturday, 23 March

from 7:45	Arrival, coffee & orange juice (in front of 5.0Ho2)
8:30	Address of welcome (5.0Ho2)
9:00	Team photos (in front of 5.0Ho2) / Jury meeting (5.1H19)
9:00	Physics Fight round 1 for <b>teams in room 5.2Ho1</b> (see fight plan)
9:45	Physics Fights round 1 in all other rooms (see fight plan)
12:30	Lunch (in front of 5.0Ho2)
13:30	Presentation FHNW (5.0Ho2)
14:15	Physics Fight round 2 for <b>teams in room 5.2Ho1</b> (see fight plan)
14:45	Physics Fights round 2 in all other rooms (see fight plan)
18:00	Dinner (registration required)

### Sunday, 24 March

from 8:00	Registration
9:00	Physics Fights round 3 (see fight plan)
12:00	Lunch (in front of 5.0Ho2)
13:15	Final Fight (5.0Ho2)
16:30	Award ceremony, Apéro (in front of 5.0Ho2)

## Swiss Young Physicists' Tournament

Where tomorrow's scientists meet.

---

### Problems for the SYPT 2019

- Invent Yourself:** Build a simple motor whose propulsion is based on corona discharge. Investigate how the rotor's motion depends on relevant parameters and optimize your design for maximum speed at a fixed input voltage.
- Aerosol:** When water flows through a small aperture, an aerosol may be formed. Investigate the parameters that determine whether an aerosol is formed rather than a jet for example. What are the properties of the aerosol?
- Undertone Sound:** Allow a tuning fork or another simple oscillator to vibrate against a sheet of paper with a weak contact between them. The frequency of the resulting sound can have a lower frequency than the tuning fork's fundamental frequency. Investigate this phenomenon.
- Funnel and Ball:** A light ball (e.g. ping-pong ball) can be picked up with a funnel by blowing air through it. Explain the phenomenon and investigate the relevant parameters.
- Filling Up a Bottle:** When a vertical water jet enters a bottle, sound may be produced, and, as the bottle is filled up, the properties of the sound may change. Investigate how relevant parameters of the system such as speed and dimensions of the jet, size and shape of the bottle or water temperature affect the sound.
- Hurricane Balls:** Two steel balls that are joined together can be spun at incredibly high frequency by first spinning them by hand and then blowing on them through a tube, e.g. a drinking straw. Explain and investigate this phenomenon.
- Loud Voice:** A simple cone-shaped or horn-shaped object can be used to optimise the transfer of the human voice to a remote listener. Investigate how the resulting acoustic output depends on relevant parameters such as the shape, size, and material of the cone.
- Sci-Fi Sound:** Tapping a helical spring can make a sound like a "laser shot" in a science-fiction movie. Investigate and explain this phenomenon.
- Soy Sauce Optics:** Using a laser beam passing through a thin layer (about 200  $\mu\text{m}$ ) of soy sauce the thermal lens effect can be observed. Investigate this phenomenon.
- Suspended Water Wheel:** Carefully place a light object, such as a Styrofoam disk, near the edge of a water jet aiming upwards. Under certain conditions, the object will start to spin while being suspended. Investigate this phenomenon and its stability to external perturbations.
- Flat Self-Assembly:** Put a number of identical hard regular-shaped particles in a flat layer on top of a vibrating plate. Depending on the number of particles per unit area, they may or may not form an ordered crystal-like structure. Investigate the phenomenon.
- Gyroscope Teslameter:** A spinning gyroscope made from a conducting, but nonferromagnetic material slows down when placed in a magnetic field. Investigate how the deceleration depends on relevant parameters.
- Moiré Thread Counter:** When a pattern of closely spaced non-intersecting lines (with transparent gaps in between) is overlaid on a piece of woven fabric, characteristic moiré fringes may be observed. Design an overlay that allows you to measure the thread count of the fabric. Determine the accuracy for simple fabrics (e.g. linen) and investigate if the method is reliable for more complex fabrics (e.g. denim or Oxford cloth).
- Looping Pendulum:** Connect two loads, one heavy and one light, with a string over a horizontal rod and lift up the heavy load by pulling down the light one. Release the light load and it will sweep around the rod, keeping the heavy load from falling to the ground. Investigate this phenomenon.
- Newton's Cradle:** The oscillations of a Newton's cradle will gradually decay until the spheres come to rest. Investigate how the rate of decay of a Newton's cradle depends on relevant parameters such as the number, material, and alignment of the spheres.
- Sinking Bubbles:** When a container of liquid (e.g. water) oscillates vertically, it is possible that bubbles in the liquid move downwards instead of rising. Investigate this phenomenon.
- Popsicle Chain Reaction:** Wooden popsicle sticks can be joined together by slightly bending each of them so that they interlock in a so-called "cobra weave" chain. When such a chain has one of its ends released, the sticks rapidly dislodge, and a wave front travels along the chain. Investigate the phenomenon.

Fight Plan SYPT 2019									
Round 1 (Saturday, 23 March, 9.45 – 12.30)									
5.0B16	Reporter			Opponent			Reviewer		
	Condensed Matter			Entangled			Irreducible		
	Gore	Anuj	4. Funnel and Ball	Bezençon	Corentin	Taleb	Rashad		
	Entangled			Irreducible			Condensed Matter		
Serra			13. Moiré Thread Counter			Jalleb	Malik	Rosmuller	Michiel
Irreducible			Condensed Matter			Entangled			
Bagnoud			6. Hurricane Balls			Dutta	Rohan	Serra	Francesca
5.1H01	Reporter			Opponent			Reviewer		
	Christmas gang			Trainspotters			BEC		
	Palmieri	Alessandro	15. Newton's Cradle	von Salis	Elia	Regenass	Carla		
	Trainspotters			BEC			Christmas gang		
Eberl			14. Looping Pendulum			Thiyagarajah	Shria	Marroni	Giorgia
BEC			Christmas gang			Trainspotters			
Kangsabanik			4. Funnel and Ball			Sladen	Emily	Seebauer	Lydia
5.1H19	Reporter			Opponent			Reviewer		
	Wierd Flux but Ok			The impossible Koalas			Stokes Flow		
	Iliyashov	Matvey	4. Funnel and Ball	Staiger	Samuel	Andreani	Jacopo		
	The impossible Koalas			Stokes Flow			Wierd Flux but Ok		
Cannavó			11. Flat Self-Assembly			Evangelista	Santiago	Shultz	Camden
Stokes Flow			Wierd Flux but Ok			The impossible Koalas			
Eyamo			14. Looping Pendulum			Maino	Alessandro	Peters	Hannah
5.2D11	Reporter			Opponent			Reviewer		
	the master debaters			Team Räupli			Degenerate States		
	West	James	4. Funnel and Ball	Antoinette	Manuel	Zhou	YanJun		
	Team Räupli			Degenerate States			the master debaters		
Eppler			17. Popsicle Chain Reaction			Blättler	Nina	Berggren	Paul
Degenerate States			the master debaters			Team Räupli			
Lindskog			14. Looping Pendulum			Rossetto	Francesco	Klein	Michael
5.2H03	Reporter			Opponent			Reviewer		
	Ω-nice			Black Physics			an unfavourable name		
	Miotto	Anna Ladina	4. Funnel and Ball	Meier	Lea	Miolin	Felix		
	Black Physics			an unfavourable name			Ω-nice		
Jyrkinen			14. Looping Pendulum			Jucker	Elio	Honold	Giulia Severina
an unfavourable name			Ω-nice			Black Physics			
Bernardi			17. Popsicle Chain Reaction			Bernhardsgrütter	Andri	Rivière	Ophélie
5.3C08	Reporter			Opponent			Reviewer		
	Symplectic Group			The fellowship of the quantum rings			Huygens		
	Garcia	Troy	4. Funnel and Ball	Miloglyadov	Fedor	Ghassabi	Mina		
	The fellowship of the quantum rings			Huygens			Symplectic Group		
Egli			11. Flat Self-Assembly			Süzen	Semih	Kaelin	Deborah
Huygens			Symplectic Group			The fellowship of the quantum rings			
Krishnan			14. Looping Pendulum			Anil	Jeril	Koradi	Nino
5.3H01	Reporter			Opponent			Reviewer		
	La Chat Hawks			import random			Singular		
	Godfrey	Andrew	4. Funnel and Ball	Wanner	Elio	Wasseh	Elias		
	import random			Singular			La Chat Hawks		
Mallik			14. Looping Pendulum			Gubser	Nicolas	Hollo	George
Singular			La Chat Hawks			import random			
Müller			7. Loud Voices			Suer	Eren	Tschudin	Moritz
5.2H01	Reporter			Opponent			Reviewer		Observer
	Absolute Zero			Gödels Dödel			Elements		The Excited Ground States
	Pace	Seth	4. Funnel and Ball	Gottschall	Ali	Cook	Emma		
	Gödels Dödel			Elements			The Excited Ground States		Absolute Zero
	Müllli	Lukas	15. Newton's Cradle	Miloglyadova	Alisa	Gotsmann	Daniel		
	Elements			The Excited Ground States			Absolute Zero		Gödels Dödel
Zarkovic			2. Aerosol			Swingler	Daniel	Umana Stuart	Callum
The Excited Ground States			Absolute Zero			Gödels Dödel		Elements	
Widmer			1. Invent Yourself			Jaszcz	Konrad	Gottschall	Ali

# Swiss Young Physicists' Tournament

Where tomorrow's scientists meet.

Fight Plan SYPT 2019								
Round 2 (Saturday, 23 March, 14.45 – 17.45)								
Fight	Reporter	Opponent	Reviewer					
5.0B16	an unfavourable name	Gödels Dödel	La Chat Hawks					
	Jucker Elio 6. Hurricane Balls	Müllli Lukas	Suer Eren					
	Gödels Dödel	La Chat Hawks	an unfavourable name					
	Gottschall Ali 14. Looping Pendulum	Godfrey Andrew	Bernardi Leoluca					
5.1H01	La Chat Hawks	an unfavourable name	Gödels Dödel					
	Hollo George 17. Popsicle Chain Reaction	Miolin Felix	Müllli Lukas					
	Absolute Zero	Team Räupli	BEC					
	Jaszcz Konrad 15. Newton's Cradle	Klein Michael	Thiyagarajah Shria					
5.1H19	Team Räupli	BEC	Absolute Zero					
	Antoinette Manuel 11. Fiat Self-Assembly	Kangsabanik Parthiv	Pace Seth					
	BEC	Absolute Zero	Team Räupli					
	Regenass Carla 5. Filling Up a Bottle	Umana Stuart Callum	Eppler Louis					
5.1H19	Reporter	Opponent	Reviewer					
	The fellowship of the quantum rings	Degenerate States	Ω-nice					
	Milogyadov Fedor 5. Filling Up a Bottle	Zhou Yanjun	Bernhardsgrütter Andri					
	Degenerate States	Ω-nice	The fellowship of the quantum rings					
5.2D11	Blättler Nina 15. Newton's Cradle	Miotto Anna Ladina	Egli Ramon					
	Ω-nice	The fellowship of the quantum rings	Degenerate States					
	Honold Giulia Severina 10. Suspended Water Wheel	Koradi Nino	Lindskog Hugo					
	Reporter	Opponent	Reviewer					
5.2H03	Black Physics	import random	the master debaters					
	Meier Lea 11. Fiat Self-Assembly	Tschudin Moritz	West James					
	import random	the master debaters	Black Physics					
	Wanner Elio 15. Newton's Cradle	Berggren Paul	Jyrkinen Oskari					
5.2H03	the master debaters	Black Physics	import random					
	Rossetto Francesco 6. Hurricane Balls	Rivière Ophélie	Mallik Anshak					
	Reporter	Opponent	Reviewer					
	The Excited Ground States	Irreducible	Wierd Flux but Ok					
5.2H03	Swingler Daniel 15. Newton's Cradle	Taleb Rashad	Maino Alessandro					
	Irreducible	Wierd Flux but Ok	The Excited Ground States					
	Jalleb Malik 3. Undertone Sound	Ilyashov Matvey	Widmer Nicola					
	Wierd Flux but Ok	The Excited Ground States	Irreducible					
5.3C08	Shultz Camden 10. Suspended Water Wheel	Gotsmann Daniel	Bagnoud Mateo					
	Reporter	Opponent	Reviewer					
	Singular	Entangled	Christmas gang					
	Gubser Nicolas 15. Newton's Cradle	Kutschke Fiona	Sladen Emily					
5.3H01	Entangled	Christmas gang	Singular					
	Bezençon Corentin 12. Gyroscope Teslameter	Palmieri Alessandro	Müller Nils					
	Christmas gang	Singular	Entangled					
	Marroni Giorgia 17. Popsicle Chain Reaction	Wasseh Elias	Kutschke Fiona					
5.3H01	Reporter	Opponent	Reviewer					
	Stokes Flow	Elements	Huygens					
	Andreani Jacopo 17. Popsicle Chain Reaction	Cook Emma	Krishnan Kedar					
	Elements	Huygens	Stokes Flow					
5.2H01	Milogyadova Alisa 14. Looping Pendulum	Ghassabi Mina	Evangelista Santiago					
	Huygens	Stokes Flow	Elements					
	Süzen Semih 15. Newton's Cradle	Eyamo Barthélémy	Zarkovic Elena					
	Reporter	Opponent	Reviewer	Observer				
5.2H01	Condensed Matter	Trainspotters	The impossible Koalas	Symplectic Group				
	Rosmuller Michiel 15. Newton's Cradle	Seebauer Lydia	Cannavó Luca					
	Trainspotters	The impossible Koalas	Symplectic Group	Condensed Matter				
	von Salis Elia 11. Flat Self-Assembly	Peters Hannah	Anil Jeril					
Start 14.15	The impossible Koalas	Symplectic Group	Condensed Matter	Trainspotters				
	Staiger Samuel 17. Popsicle Chain Reaction	Garcia Troy	Dutta Rohan					
	Symplectic Group	Absolute Zero	Gödels Dödel	The impossible Koalas				
5.2H01	Kaelin Deborah 3. Undertone Sound	Gore Anuj	Eberl Emily					

Fight Plan SYPT 2019							
Round 3 (Sunday, 24 March, 9.00 – 12.00)							
Fight	Reporter			Opponent		Reviewer	
5.0B16	Absolute Zero			BEC		Trainspotters	
	Umana Stuart	Callum	7. Loud Voices	Regenass	Carla	von Salis	Elia
	BEC			Trainspotters		Absolute Zero	
	Thiyagarajah	Shria	8. Scie-Fi Sound	Eberl	Emily	Jaszcz	Konrad
5.1H01	Trainspotters			Absolute Zero		BEC	
	Seebauer	Lydia	16. Sinking Bubbles	Pace	Seth	Kangsabanik	Parthiv
	The Excited Ground States			Singular		Degenerate States	
	Gotsmann	Daniel	14. Looping Pendulum	Müller	Nils	Blättler	Nina
5.1H19	Singular			Degenerate States		The Excited Ground States	
	Wasseh	Elias	8. Scie-Fi Sound	Lindskog	Hugo	Swingler	Daniel
	Degenerate States			The Excited Ground States		Singular	
	Zhou	Yanjun	12. Gyroscope Teslameter	Widmer	Nicola	Gubser	Nicolas
5.2D11	Team Räupli			La Chat Hawks		Ω-nice	
	Klein	Michael	5. Filling Up a Bottle	Hollo	George	Miotto	Anna Ladina
	La Chat Hawks			Ω-nice		Team Räupli	
	Suer	Eren	15. Newton's Cradle	Honold	Giulia Severina	Antoinette	Manuel
5.2H03	Ω-nice			Team Räupli		La Chat Hawks	
	Bernhardsgrütter	Andri	6. Hurricane Balls	Eppler	Louis	Godfrey	Andrew
	Black Physics			Symplectic Group		Elaments	
	Rivière	Ophélie	16. Sinking Bubbles	Kaelin	Deborah	Miloglyadova	Alisa
5.3C08	Symplectic Group			Elaments		Black Physics	
	Anil	Jeril	15. Newton's Cradle	Zarkovic	Elena	Meier	Lea
	Elaments			Black Physics		Symplectic Group	
	Cook	Emma	6. Hurricane Balls	Jyrkinen	Oskari	Garcia	Troy
5.3H01	Reporter			Opponent		Reviewer	
	The fellowship of the quantum rings			Christmas gang		The impossible Koalas	
	Koradi	Nino	1. Invent Yourself	Marroni	Giorgia	Staiger	Samuel
	Christmas gang			The impossible Koalas		The fellowship of the quantum rings	
5.3H01	Sladen			Cannavó		Miloglyadov	
	Emily		14. Looping Pendulum	Luca		Fedor	
	The impossible Koalas			The fellowship of the quantum rings		Christmas gang	
	Peters	Hannah	7. Loud Voices	Egli	Ramon	Palmieri	Alessandro
5.3H01	Reporter			Opponent		Reviewer	
	Huygens			Entangled		the master debaters	
	Ghassabi	Mina	2. Invent Yourself	Serra	Francesca	Rossetto	Francesco
	Entangled			the master debaters		Huygens	
5.3H01	the master debaters			Huygens		Entangled	
	Berggren	Paul	5. Filling Up a Bottle	Krishnan	Kedar	Bezençon	Corentin
	Wierd Flux but Ok			an unfavourable name		Stokes Flow	
	Maino	Alessandro	6. Hurricane Balls	Bernardi	Leoluca	Eyamo	Barthélémy
5.3H01	an unfavourable name			Stokes Flow		Wierd Flux but Ok	
	Miolin	Felix	11. Flat Self-Assembly	Andreani	Jacopo	Iliyashov	Matvey
	Stokes Flow			Wierd Flux but Ok		an unfavourable name	
	Evangelista	Santiago	15. Newton's Cradle	Shultz	Camden	Jucker	Elio
5.2H01	Reporter			Opponent		Reviewer	
	import random			Condensed Matter		Irreducible	
	Tschudin	Moritz	9. Soy Sauce Optics	Rosmuller	Michiel	Jalleb	Malik
	Condensed Matter			Irreducible		import random	
5.2H01	Dutta			Bagnoud		Wanner	
	Rohan		7. Loud Voices	Mateo		Elio	
	Irreducible			import random		Condensed Matter	
	Taleb	Rashad	8. Scie-Fi Sound	Mallik	Anshak	Gore	Anuj

# Swiss Young Physicists' Tournament

Where tomorrow's scientists meet.

---

## Regulations for the SYPT 2019

### 1. Swiss Young Physicists' Tournament

The **Swiss Young Physicists' Tournament** (SYPT) is a physics competition for students in secondary school. Participants are challenged to prepare a theoretical and experimental solution to a complex problem and to present and defend their solution in a debate (Physics Fight) against the opposing team's scrutiny.

The SYPT takes place on two consecutive days (e.g. Saturday and Sunday) before the International Young Physicists' Tournament (IYPT) of the same year (i.e. usually between March and May). The tournament is organised by the association Pro IYPT-CH.

In order to facilitate preparation for students wishing to participate at the SYPT, Pro IYPT-CH organises the SYPT Physics Week. The **SYPT Physics Week** is a week-long preparation course during which participants can conduct measurements and learn the basic skills required at the SYPT.

The **problems** for the SYPT are identical to the ones at the IYPT. However, due to organisational reasons, Pro IYPT-CH may offer preparation courses only to a selection of the problems during the SYPT Physics Week. The problems are published online on [www.iypt.org](http://www.iypt.org) and on [www.sypt.ch](http://www.sypt.ch) at least four months before the SYPT.

### 2. Website

Important information (deadlines, problems, results, etc.) about the SYPT and the Swiss team at the IYPT are published on the SYPT website ([www.sypt.ch](http://www.sypt.ch)).

### 3. Preregistration and Application

The **deadline** for registration is 9 December 2018. This date applies both for students wishing to participate at the SYPT and the SYPT Physics Week as well as for students who only wish to participate at the SYPT.

An application is only valid if the **terms of participation** arrive on time and with the respective signatures. The terms of participation can be found on [www.sypt.ch](http://www.sypt.ch).

There are two possible ways to apply. In any case the deadline mentioned above apply:

- School teams: Any secondary school (including international schools, private schools and others) in Switzerland can nominate one or several **teams of three students**. As an exception the organiser may allow teams of two or four students.
- Individual participants: The organiser will try to match students applying as **individuals** with other students to form teams of three students.

Each student in a team has to present the solution to a different problem.

### 4. Fees

The participation at the SYPT and SYPT physics week is **free**. The costs for train tickets (half-fare), food and, if necessary, accommodation are covered by the organiser and/or the host in accordance with the "Spesenreglement" of Pro IYPT-CH. Pro IYPT-CH has a limited budget for experimental equipment. Please contact the president in due time if you would like to benefit from financial support. The exact procedure is defined by the "Beschaffungsreglement" of Pro IYPT-CH.

### 5. Preparation

Pro IYPT-CH seeks the support of **universities and research institutes** (e.g. ETH, Empa, etc.) in order to allow the students to use adequate experimental equipment where the schools cannot provide this or to get in contact with experts in the respective field. In addition, Pro IYPT-CH organises the SYPT Physics Week during which students receive coaching and can prepare for

the tournament.

## 6. Fight Plan

All teams participate in three rounds of **preliminary Physics Fights**. The fight plan is published two weeks before the start of the SYPT. Each student in a team takes the role of Reporter, Opponent and Reviewer exactly once. The Physics Fights are in **English**. In justified cases the organiser may allow exceptions.

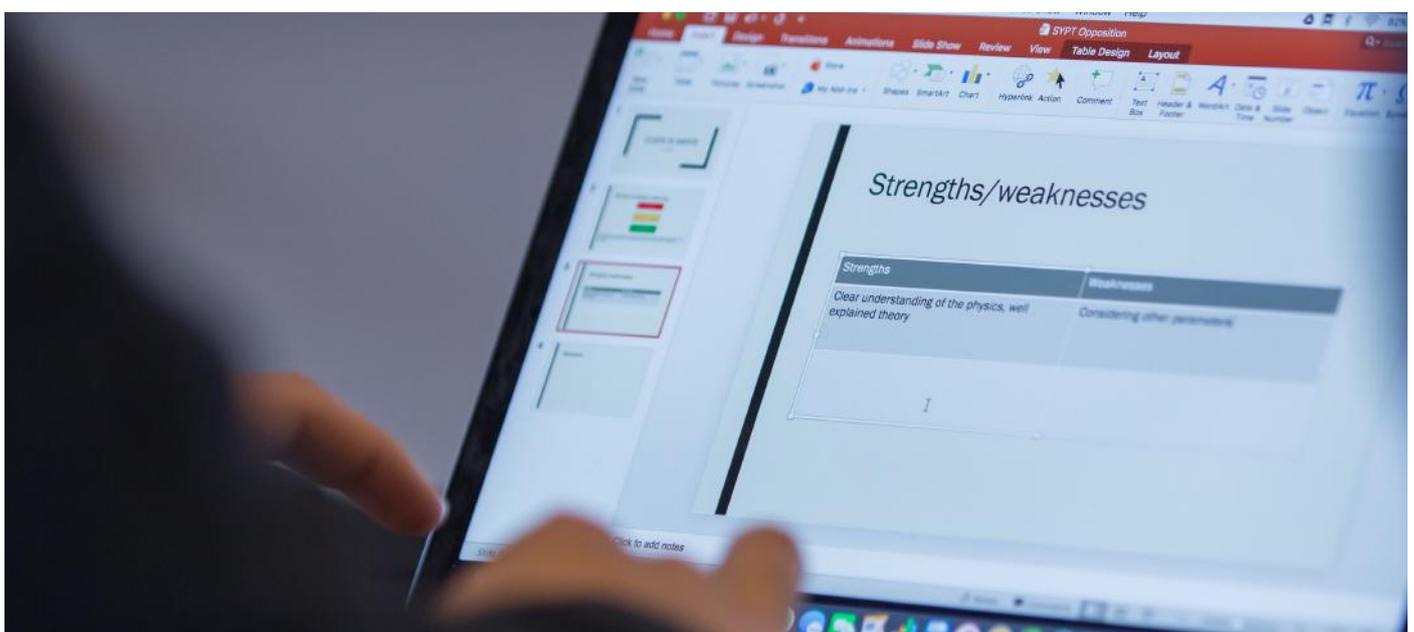
## 7. Physics Fight regulations

### 7.1. Stages and Time Schedule

At the start of a round the jury members and the teams briefly introduce themselves.

A Physics Fight with three teams is divided into three stages. In each stage the roles of the **Reporter**, **Opponent** and **Reviewer** are assigned according to the table below. If there are teams with more or less than three students or Physics Fights with more or less than three teams, similar schemes apply.

Physics Fight with three teams			
Stage	1	2	3
Team 1	Rep	Rev	Opp
Team 2	Opp	Rep	Rev
Team 3	Rev	Opp	Rep



## Swiss Young Physicists' Tournament

Where tomorrow's scientists meet.

---

The tasks for the three students actively involved in a fight are as follows:

- The **Reporter** presents his/her solution for the selected problem. The solution is expected to cover at least an important aspect of the problem with a theoretical model and experimental results verifying this model. The solution should be understandable for a secondary school student.
- The **Opponent** asks clarifying and critical questions and points out possible shortcomings and mistakes in the solution presented by the Reporter. He/She shows the presentation's strengths and weaknesses. The discussion has to be based on the solution presented by the Reporter (not on the Opponent's). A good Opponent should lead the discussion in a way that both participants can learn something new.
- The **Reviewer** comments on the performances of both Reporter and Opponent.

The Physics Fight follows a strict timetable (see table below). After the time reserved for a phase has been used up no new thought may be added. If the preparation time is exceeded, the time for the next phase is shortened accordingly.

Phase	Time (total 45')
Presentation of the Reporter	12'
Clarifying questions of the Opponent to the Reporter	2'
Preparation of the Opponent	3'
Review of the presentation (maximum 5') and discussion between Opponent and Reporter	11'
Summary of the discussion by the Opponent	1'
Questions of the Reviewer to the Reporter and the Opponent	3'
Preparation of the Reviewer	2'
Review of the performances of the Reporter and the Opponent by the Reviewer	4'
Concluding remarks of the Reporter	2'
Questions of the jury to all three teams	5'

### 7.2. Team work and aids

During a Physics Fight the team members are allowed to communicate with each other. Support from outside the team (e.g. from their physics teacher) is strictly forbidden. The use of internet during a fight is strictly forbidden.

During each stage of a Physics Fight there is only one active participant per team. The other team members are allowed to help with short comments or give technical support.

### 8. Jury

The Jury is organised by Pro IYPT-CH. There are at least three jurors in each Physics Fight of which one acts as chairperson and ensures that the SYPT regulations are obeyed.

At the end of each stage the jury assesses the performances and every juror shows marks from 1 to 10 for each of the teams involved in the stage. The **score** for a team corresponds to the weighted average (highest and lowest mark with 50 %, all others with 100 %) multiplied by 3 (Reporter), 2 (Opponent) and 1 (Reviewer).

### 9. Ranking

The grades of each fight are used to make a team and an individual ranking. Both rankings will be published.

## 10. Final Fight

The three teams with the **highest total score** after three rounds qualify for the **Final Fight**. In case of two teams in third place with the same total score the more balanced individual scores are preferred. In the Final Fight the third team after three rounds presents first, the first team last.

Within thirty minutes after announcing the participants of the Final Fight, the teams notify the organiser of their favourite problem. If two teams intend to present the same problem, the better-placed team has higher priority. The accepted problems are announced immediately.

The Final Fight follows the same regulations as the normal Physics Fights. Each team member has to be on stage in at least one role. In a team of two the reporter may be on stage only once.

## 11. Team Qualification

The organiser (in cooperation with the jury) **invites up to nine** (in exceptional cases ten) participants (SYPT champion and up to six or seven more) for the team qualification where the Swiss team for the IYPT is selected.

Only participants in the individual ranking (see point 12) are eligible to participate at the team qualification.

## 12. Absence of a team member

In case one or more team members are unexpectedly **unable to attend** a Physics Fight, the team must inform the organisers immediately.

The team is expected to perform the roles of the missing team members. The grades the remaining team members receive in these stages count as follows:

- The grades in the opposition count 25% and the grades in the review count 50% for the team ranking. The grades in the report do not count for the team ranking.
- The other fractions (75% opposition, 50% review) are made up out of the average grades the present team members received in their originally planned stage. The weighted average of these marks is then counted as the final grade for the team ranking.
- The grades in these stages do not influence the individual ranking.

In case a team is reduced to only one team member, the remaining team member may find one additional helper who is eligible to participate at the SYPT and is not active in another fight. The helper is not allowed to take a role on stage. The organisers then must be informed immediately.

A participant must perform at least one report and one opposition in the three preliminary physics fights in order to be ranked in the individual ranking.

## 13. Disciplinary action and Violations of Regulations

Participants or teams that violate the SYPT regulations can be sanctioned by a point deduction of up to 10 points per participant or disqualification.

All participants must behave in an appropriate manner. Unfair behaviour can lead to point deduction of up to 10 points per participant or disqualification.

The final decision on any possible sanctions is taken by Pro IYPT-CH.

## Swiss Young Physicists' Tournament

Where tomorrow's scientists meet.

---

### 14. Appeal

In case one or several participant or juror feels an action or behaviour of an individual or group does not comply with the SYPT regulations, he or she may choose to report this. The procedure is as follows:

#### For incidents not concerning grading:

- For incidents occurring during a Physics Fight:  
The incident must first be reported to the chair of the jury. In case the matter cannot be resolved, the incident may be reported to the organisers. Pro IYPT-CH will decide on further actions or consequences.
- For other incidents:  
The incident must be reported to the organisers. Pro IYPT-CH will decide on further actions or consequences.

#### For incidents concerning grading:

- The incident must be reported to the organisers no later than one hour after the respective fight round has finished. The report must include a justification why the grading should be reconsidered. Pro IYPT-CH will then make a final decision. Pro IYPT-CH will in any case justify its decision towards the involved parties.

**Note:** A retrospective change of a grade or its weighting will only be considered in extreme cases. Due to organisational reasons any change of grades will only influence the individual ranking.

### 15. Responsibilities

The regulations have been approved by the association Pro IYPT-CH.

Zurich, 14/12/2016



## Ranking, Team Qualification and Awards

In addition to the **team ranking**, a ranking of the scores of all participants (**individual ranking**) is published. The latter is based on the weighted sum of all individual scores in the first three rounds.

The team with the highest score in the Final Fight wins the **SYPT Team Competition**.

Nine participants qualify for the **IYPT team qualification**. They are selected by Pro IYPT-CH (in cooperation with the jury) based on their skills shown during the physics fights. Students participating in the team qualification have to prepare a second problem and participate in the team qualification event (MNG Rämibühl Zürich, 5/6 May 2019).

All participants receive a **certificate** confirming their successful participation at the SYPT, and a small gift. The final teams and up to five additional teams will be awarded with medals and attractive prizes.

Rankings are published on [www.sypt.ch](http://www.sypt.ch).



Swiss Young  
Physicists' Tournament

Where tomorrow's scientists meet.

---

Pro IYPT-CH and the SYPT are greatly supported by:



University of Applied Sciences and Arts  
Northwestern Switzerland



Swiss Academy of Sciences  
Akademie der Naturwissenschaften  
Accademia di scienze naturali  
Académie des sciences naturelles

SwissLife

