

## Summer School on Dark Matter

### Session CXVIII

July 26 - August 20, 2021

**Organizers:** Marco Cirelli, Babette Döbrich, Jure Zupan

**Overview:** Dark Matter (DM) is the substance that fills about 26% of the total budget of the Universe and that accounts for about 80% of the matter. By its very nature the topic lies at the intersection of different research fields: astrophysics, cosmology and fundamental particle physics. A coordinated approach among different disciplines is hence crucial to make progress. This School aims to train the next generation of young researchers in the field with two main guidelines: 1) starting from the basics, with no theoretical (or experimental) prejudice; 2) making the most of the interdisciplinarity of the topic.

**Website:** <https://indico.cern.ch/e/LHDM2021>

#### Lectures:

##### Long courses:

**Anne Green** (Nottingham)

**Joshua Ruderman** (NYU)

**Tracy Slatyer** (MIT)

**Philip Harris** (MIT)

**Igor Irastorza** (Zaragoza)

Dark Matter in cosmology

Dark Matter Production

Dark Matter Indirect Detection: from KeV to multi TeV

Dark Matter at accelerators

Axion Dark Matter (including theory and experiments)

##### Short courses:

**Jonathan Feng** (UC Irvine)

**Jody Cooley** (SMU Texas)

**Joachim Brod** (Cincinnati)

**Annika Peter** (Ohio State)

**Justin Khoury** (U Penn)

**Clare Burrage** (Nottingham)

**Bernard Carr** (Cambridge)

**Lam Hui** (Columbia)

**Surjeet Rajendran** (JHU)

**Yonit Hochberg** (Hebrew U Jerusalem)

**Tongyan Lin** (UCSD)

**Joachim Kopp** (CERN)

**Jim Cline** (McGill)

Standard WIMPs

Direct Detection of classical WIMPs

Dark Matter Effective Field Theories

Dark Matter numerical simulations

Modified gravity for Dark Matter and alternatives to particle DM

Connection between Dark Matter and DE and extended gravity

Primordial Black Holes as Dark Matter candidates

'Fuzzy' ultralight Dark Matter

New avenues in experimental searches for Dark Matter

SIMPs

Sub-GeV Dark Matter

Sterile Neutrinos

Dark atoms, composite dark states

**Registration:** The online Application Form can be found at <https://www.houches-school-physics.com>. Applications must reach the School before March 15, 2021 in order to be considered by the Selection Committee. The full cost per participant includes housing and meals, and is specified on the School's Website. Further information can be found on the website too. For Scientific Matters, please contact the organizers at [LHDM2021@gmail.com](mailto:LHDM2021@gmail.com). For Administrative and Logistic Matters, please contact the Les Houches Physics School at:

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**Location:** Les Houches is a village located in Chamonix valley, in the French Alps. Established in 1951, the Physics School is situated at 1150 m above sea level in natural surroundings, with breathtaking views on the Mont-Blanc mountain range, conducive to reflection and discussion.