

# **Foundations of Cosmic Ray Astrophysics - Varenna 2022**

**Thursday, June 23, 2022 - Wednesday, June 29, 2022**

**Villa Monastero in Varenna**

## **Scientific Program**

The School schedule is available [here](#).

## High-energy Cosmic Rays and gamma-radiation

Lecturer: Felix Aharonian (DIAS, Dublin, Ireland and MPIK, Heidelberg, Germany)

**Slides:**

- available [here](#)

**Lecture Notes:**

- not available yet

**Additional suggested readings:**

F. Aharonian and S. Casanova, Selected Topics in Gamma-Ray Astronomy, 2018 [link](#)

F. Aharonian, VHE Gamma-rays, Chapter 1, Snowmass, 2022 [link](#)

## Particle acceleration in Pulsars and PWNe

Lecturer: Elena Amato (INAF Arcetri Observatory, Italy)

**Slides:**

- available [here](#)

**Lecture Notes:**

- not available yet

**Additional suggested readings:**

- not available yet

## Charged particles in turbulent fields and Cosmic Ray transport

Lecturer: Pasquale Blasi (GSSI and INFN, L'Aquila, Italy)

**Slides:**

- available [here](#)

**Lecture Notes:**

- not available yet

**Additional suggested readings:**

- not available yet

## **Cosmic Ray propagation in extragalactic space and secondary messengers**

**Lecturer: Denise Boncioli (L'Aquila University and INFN, Italy)**

**Slides:**

- available here

**Lecture Notes:**

- not available yet

**Additional suggested readings:**

- Berezhinsky & Grigorieva, Astronomy and Astrophysics 1988, 199, 1 ads
- Berezhinsky, Gazizov & Grigorieva, Phys.Lett.B 2005, 612, 147 ads
- Berezhinsky, Gazizov & Grigorieva, Phys.Rev.D 2006, 74, 043005 ads

## **Particle acceleration at shocks and in turbulence**

**Lecturer: Damiano Caprioli (The University of Chicago, USA)**

**Slides:**

- available here

**Lecture Notes:**

- not available yet

**Additional suggested readings:**

- Bell, MNRAS 1978, 182, 147 ads
- Blasi, Nuovo Cimento 2019, 42, 12 ads
- Caprioli, Proceedings of the ICRC2015 ads

## **Future facilities in high-energy astrophysics**

**Lecturer: Emma de Oña Wilhelmi (DESY, Hamburg, Germany)**

**Slides:**

- available here

**Lecture Notes:**

- not available yet

**Additional suggested readings:**

- not available yet

## **Phenomenological models of Cosmic Ray transport in Galaxies**

**Lecturer:** Carmelo Evoli (GSSI and INFN, L'Aquila, Italy)

**Slides:**

- available here

**Lecture Notes:**

- not available yet

**Additional suggested readings:**

- Jones et al., ApJ 2001, 547, 264 ads
- Lee, ApJ 1979, 229, 424 ads
- Evoli et al., PRD 2021, 103, 083010 ads

## **Star Formation Regions and Cosmic Rays**

**Lecturer:** Stefano Gabici (APC, Paris, France)

**Slides:**

- not available yet

**Lecture Notes:**

- not available yet

**Additional suggested readings:**

- not available yet

## **Cosmic Ray induced instabilities in astrophysical systems**

**Lecturer:** Alexandre Marcowith (Université Montpellier and CNRS/IN2P3, Montpellier, France)

**Slides:**

- available here

**Lecture Notes:**

- not available yet

**Additional suggested readings:**

- not available yet

## **Interactions of Cosmic Rays with matter and radiation**

**Lecturer: Pasquale Dario Serpico (LAPTh, Annecy, France)**

**Slides:**

- available here

**Lecture Notes:**

- available here

**Additional suggested readings:**

- not available yet

## **Magnetic reconnection**

**Lecturer: Lorenzo Sironi (Columbia University, USA)**

**Slides:**

- available here

**Lecture Notes:**

- not available yet

**Additional suggested readings:**

- not available yet

## **Basics of Cosmic Ray Feedback**

**Lecturer: Ellen Zweibel (University of Wisconsin-Madison, USA)**

**Slides:**

- not available yet

**Lecture Notes:**

- not available yet

**Additional suggested readings:**

- not available yet