

**International School of Cosmic-Ray Astrophysics**  
<<M.M. Shapiro>>

**21<sup>st</sup> Course: “Astroparticle Physics: Yesterday, Today and Tomorrow.”**

**Directors: J.P. Wefel, T. Stanev, J. Hörandel**  
**Secretary: Arthur Smith**

**Thursday, 2 August 2018**

Note: below “Break” denotes break for coffee and discussion and posters

Chair: Watson

08:45—09:00	<b>Welcome &amp; Purpose of the Course</b>	Hörandel, Stanev, (Wefel)
09:00—10:10	<b>Historical Introduction: Basic Properties of Cosmic Ray</b>	Hörandel
10:10—11:25	<b>Direct Cosmic Ray Detection (1)</b>	Marrocchesi
11:25—11:55	<b>Break (hang Posters)</b>	
11:55—12:55	<b>Air Shower Detection and the Cosmic Ray Spectrum at High Energy</b>	Stanev

Chair: Marrocchesi

15:00—16:00	<b>What are Extensive Air Showers and why are they useful?</b>	Watson
16:00 – 17:00	<b>Gamma Ray Astronomy (1)</b>	Stegmann
17:00—17:30	<b>Break (Posters)</b>	
17:30 – 17:45	<b>Searching for Astrophysical Neutrinos Coincident with Gamma-Ray Bursts with IceCube</b>	Friedman
17:45 – 18:00	<b>Lorentz Invariance Violation on Astrophysics</b>	Guedes Lang
18:00 – 19:00	<b>Dark Matter: The Astrophysical Evidence</b>	Sarkar

All the lectures take place in the Dirac Lecture Hall, San Domenico

Day 2