



ASTROPARTICLES

Enrollment year	2017/2018
Academic year	2018/2019
Regulations	DM270
Academic discipline	FIS/05 (ASTRONOMY AND ASTROPHYSICS)
Department	DEPARTMENT OF PHYSICS
Course	
Curriculum	Fisica della materia
Year of study	2°
Period	2nd semester (04/03/2019 - 14/06/2019)
ECTS	6
Lesson hours	48 lesson hours
Language	Italian
Activity type	ORAL TEST
Teacher	CATTANEO PAOLO WALTER (titolare) - 6 ECTS
Prerequisites	<p>It is desirable that the students have followed the courses of the first three years relevant for the course topic:</p> <ul style="list-style-type: none">- Introduction to nuclear physics- Introduction to subnuclear physics- Introduction to astronomy
Learning outcomes	Introduction to the high energy astrophysical topics most closely related to the particle physics. The expected results are the possibility of dealing without support the literature on those arguments.
Course contents	<p>The main topics are:</p> <ul style="list-style-type: none">- Phenomenology of high energy cosmic rays- Phenomenology of high energy cosmic neutrinos- Experiments dedicated to high energy cosmic rays- Experiments dedicated to high energy cosmic neutrinos- Phenomenology of gravitational waves

	<ul style="list-style-type: none"> -Experiments dedicated to gravitational waves - Phenomenology of dark matter - Direct and indirect detection of dark matter
Teaching methods	Lectures supported with slides. The slides are later available to the students on the lecturer web site.
Reccomended or required readings	<ul style="list-style-type: none"> - Cosmic rays and particle physics, T. Gaisser, Cambridge University Press - Lezioni di cosmologia teorica, Maurizio Gasperini, Springer-Verlag 2012 - Theory of ' gravitational interaction, Maurizio Gasperini, Springer-Verlag 2010 - Introduction to particle cosmology, Cosimo Bambi e Alexandre D. Dolgov, Springer-Verlag 2016 - Cosmic ray astrophysics, Reinhard Schlickeiser, Springer-Verlag 2003 - Astroparticle physics, Claus Grupen, Springer-Verlag 2010
Assessment methods	<p>The exam is only oral and consists of the first part where the student presents a topic of his/her choice discussed in the course, possibly with an in-depth discussion for 15'.</p> <p>In the second part the lecturer questions the student on topics presented in the course not discussed in the first part, for additional 15'.</p>
Further information	Teaching resources available at: http://www2.pv.infn.it/~cattaneo/astroparticelle-2016-2017.html
Sustainable development goals - Agenda 2030	\$ibl legenda sviluppo sostenibile