

AGPhil 6: History and Philosophy of Astroparticle Physics

Zeit: Donnerstag 14:15–16:15

Raum: M014

Hauptvortrag AGPhil 6.1 Do 14:15 M014
Die Ursprünge der modernen Astroteilchenphysik im frühen 20. Jh. — ●VANESSA CIRKEL-BARTELT — IZWT - BU Wuppertal

Die Astroteilchenphysik in ihrer heutigen Form geht auf verschiedene Ursprünge und Einflüsse zurück, der wichtigste dabei ist wohl die Erforschung der kosmischen Höhenstrahlung im frühen 20. Jh.. Nach einem kurzen Einblick in die Vorgeschichte wird der Vortrag die Hauptentstehungs- und Etablierungsphase dieses neuen Forschungsgebiets zwischen 1912 und 1932 beleuchten. Außerdem soll ein kurzer Ausblick auf die weitere Entwicklung dieses Feldes nach dem Zweiten Weltkrieg und ihre langfristige Bedeutung für die moderne Astroteilchenphysik gegeben werden. Abschließend werden die wissenschaftstheoretischen Implikationen der historischen Analyse kurz skizziert und zur Diskussion gestellt.

Hauptvortrag AGPhil 6.2 Do 14:45 M014
Emergence of astroparticle physics: a historical approach — ●BERNARD REVAZ — Département de physique nucléaire et corpusculaire, University of Geneva, CH-1211 Geneva 4

Since 20 years, the physics of the particles of the cosmos enjoys a renewed interest, as seen from numerous large experiments, in operation or foreseen, in the search of new weakly interactive particles, in the astronomy based on new *messengers* like neutrinos, or the in the study of the so called *violent* universe. Although this field shares the general thematic of the *cosmic rays* that exists since the beginning of the 20th century, it has distinctive features that justified for its proponents a clear separation with the cosmic rays community as witnessed by the creation of the neologism *astroparticle physics*. Astroparticle physics emerged from a network of loosely connected medium scale experiments, developed principally as a redeployment of accelerator particle physics techniques, in a post cold war political context characterized by a growing criticism against the hierarchical model inherited from the post WWII. From an epistemological point of view, the emerging field of astroparticle physics is characterized by local epistemologies that are used as a pragmatic resource, among oth-

ers, by the scientists acting in the field. These local epistemologies contrast with the unifying perspective reconciling general relativity and quantum field theories that serves as the long term horizon of the field.

Hauptvortrag AGPhil 6.3 Do 15:15 M014
Status of astroparticle physics — ●JULIA BECKER — Institutionen für Physik, Göteborgs Universitet

The field of astroparticle physics is currently developing rapidly due to the interplay of new experimental results and new theories for the emission mechanisms of Cosmic Rays. In this talk, the current status of astroparticle physics is reviewed in the context of the field's historical development. In particular physics implications of the newest experimental results for charged Cosmic Rays, high-energy photons, neutrinos and antimatter are presented.

Hauptvortrag AGPhil 6.4 Do 15:45 M014
Unification in astroparticle physics — ●WOLFGANG RHODE¹ and BRIGITTE FALKENBURG² — ¹TU Dortmund, Fakultät 2, Experimentelle Physik Vb, 44221 Dortmund — ²TU Dortmund, Fakultät 14, Institut für Philosophie und Politikwissenschaft, 44221 Dortmund

Astroparticle physics makes the bridge between the domains of several physical theories that lack theoretical unification. The models and experiments of astroparticle physics are based on the standard model of particle physics and the standard model of cosmology. The theoretical foundations of these two standard models, namely quantum field theory and general relativity, are incompatible. In addition, models from other parts of physics are employed, i.e., nuclear physics. We will give a few examples of modelling in astroparticle physics and discuss the way in which they are able to unify the small scale and the large scale of physics.

Literature: B.Falkenburg und W.Rhode: Astroteilchenphysik: Die Brücke zwischen Mikro- und Makrokosmos (mit W.Rhode). In: B.Falkenburg (Hrsg.), Natur – Kultur – Technik. Paderborn: Mentis 2007.