



## Discover the COSMOS: e-Infrastructures for an Engaging Science Classroom

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### Abstract

Discover the COSMOS is a Coordination Action project (2011-2013) funded by the European Commission's Framework Programme 7 and composed of 15 universities, research institutes and centres in eight European countries and the USA. Its aim is to demonstrate innovative ways to engage teachers and students in science through the utilisation of existing e-Infrastructures. This should help to reverse the declining student interest in science and encourage more to follow scientific courses. Situated within current re-schooling initiatives in Europe and beyond, the project aims to help realise the vision for the science classroom of tomorrow by (a) demonstrating effective community building between researchers, teachers and students and empowering the latter to use, share and exploit the collective power of unique scientific resources in meaningful educational activities, that promote inquiry-based learning and appreciation of how science works, (b) demonstrating effective integration of science education with e-infrastructures through a monitored-for-impact use of e-Science activities and (c) documenting the process through the development of a roadmap that will include guidelines for the design and implementation of effective educational and outreach activities. Tapping into expertise from frontier scientific and educational research in formal and informal science learning, the Discover the COSMOS initiative acts as a vehicle through which Europe's e-infrastructures can be fully exploited by providing powerful tools for the effective introduction of e-Science initiatives in the school science curriculum framed in a pedagogical approach that promotes inquiry-based teaching and learning. In doing so, it creates a rich repertoire of e-Science applications that enable secondary school students to experiment with, appreciate and learn how cutting-edge science works by 'entering' the world of research in Astronomy and Particle Physics. These infrastructures include the Large Hadron Collider (LHC) at CERN and its dedicated experiments ATLAS and CMS, the Gaia global space astrometry mission and the Faulkes and Liverpool Telescopes. The Discover the COSMOS consortium brings together key players in the field of astronomy and particle physics outreach who have invested major efforts over recent years to introduce frontier research issues school science classrooms in Europe and beyond. The e-Science applications included in the framework of Discover the COSMOS educational activities enhance the effectiveness and quality of the teaching and learning process by employing advanced and highly interactive visualisation technologies that offer a 'feel and interact' user experience, allow for learning 'anytime, anywhere' and provide personalised ubiquitous learning paradigms. They have also been tested in different educational settings (schools, teacher training centres, outreach programmes, workshops, and summer schools) in Europe and beyond and have proven their efficiency and efficacy as inquiry based resources.