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Highest Energy Observations in Multi-Messenger Astronomy

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Abstract

Multi messenger astronomy has now become a major avenue to explore the universe after decades of successive developments in astrophysical observations and phenomenology. It uses complementary pieces of information provided by different messengers, like photons, cosmic rays, gravitational waves, and neutrinos emitted from well-know sources, to derive a complete phenomenological picture of an astronomical event. These messengers also help in measuring the key cosmological parameters of the universe. In this contribution, an overview of Indian efforts in high-energy gamma-ray and cosmic-ray measurements within the emerging discipline of multi-messenger research is discussed. Given the recent developments in the field, this contribution focuses in particular on the ground-based gamma-ray astronomy with MACE at Hanle and cosmic-ray particle detection with GRAPES-3 at Ooty.

Biography of the Speaker

Dr. Krishna Kumar Singh is currently working as a Scientific Officer-F at the Astrophysical Sciences Division (ApSD) of the Bhabha Atomic Research Centre (BARC), Mumbai. He has been associated with the high energy astrophysics program of BARC since 2008 after graduating from the 51st Batch of BARC Training School in Physics discipline. Dr. Singh has received his Ph.D. degree in the field of high energy astrophysics from the Homi Bhabha National Institute, Mumbai. He has also worked as the Post Doctoral Fellow at the University of the Free State, South Africa for two years. His area of interest includes high energy astrophysics, multi-messenger astronomy, astroparticle physics and observational cosmology.

Dr Singh is a recipient of DAE-Young Scientist Award and two DAE-Group Achievement Awards. He is a member of prestigious Indian National Young Academy of Sciences (INYAS), National Academy of Sciences India (NASI), and International Astronomical Union (IAU). He is also an associate member of the Square Kilometer Array (SKA) Science Consortium, and life-time member of the Indian Physics Association (IPA) and Astronomical Society of India (ASI).