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Michigan Institute for Plasma Science and Engineering

Joint HEP/Astrophysics - MIPSE seminar

Monday
September 29, 2014
4:00 pm
335 West Hall
Central Campus

Prof. Brian W. O'Shea

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(Sabbatical Visitor - UM Dept. of Astronomy)

Galaxy Clusters: Laboratories for Extreme Plasma Physics

Galaxy clusters are the most massive virialized objects in the universe, and have the potential to be highly accurate probes of cosmological parameters. A fundamental challenge for cluster cosmology is to estimate the masses of these objects using observational proxies such as X-ray luminosity and temperature, which are complicated by the merger history of clusters and the microphysical properties of the intracluster medium. These effects, while frustrating to cosmologists, provide a rich laboratory for exploring the plasma physical processes that are occurring in these massive objects. In this talk I present recent efforts to understand the effects that several plasma processes - including conduction, cosmic ray acceleration, and condensation - have on the observable properties of galaxy clusters.

About the Speaker: Brian O'Shea received his B.S. in Engineering Physics at the University of Illinois in Urbana-Champaign (UIUC) in 2000, and his PhD in physics from UIUC in 2005 (with 2002-2005 being spent as a graduate student in residence at the Laboratory for Computational Astrophysics at UC San Diego). He was then a Director's Postdoctoral Fellow at Los Alamos National Laboratory, with a joint appointment between the Theoretical Astrophysics Group and the Applied Physics Division. Since 2008, he has been a member of the faculty at Michigan State University, with a joint appointment between the Department of Physics and Astronomy and Lyman Briggs College (assistant professor 2008-12, associate professor 2014-present). Dr. O'Shea is a computational and theoretical astrophysicist studying cosmological structure formation, including galaxy formation and the behavior of the hot, diffuse plasma within galaxy clusters. He is also a co-author of the Enzo AMR code, an export in high performance computing, and an advocate for open-source computing and open-source science. He has authored or co-authored over 40 peer-reviewed journal articles in astrophysics, computer science, and education research journals.