APR12-2012-000292

Abstract for an Invited Paper
for the APR12 Meeting of
the American Physical Society

A quest for sources of ultrahigh energy cosmic rays

KUMIKO KOTERA, Caltech

The origin of ultrahigh energy cosmic rays (UHECRs, particles arriving on the Earth with energy $10^{17} - 10^{21}$ eV) is still a mystery. I will review the experimental and theoretical efforts that are being deployed by the community to solve this long-standing enigma, including the recent results from the Auger Observatory. I will discuss the observable signatures that help narrow down the list of possible candidate sources, namely the distribution of the arrival directions of UHECRs in the sky, their energy spectrum, their chemical composition, and their multi-messenger signatures (in neutrinos, gamma-rays and gravitational waves). I will focus in particular on one candidate source that has been little discussed in the literature: young rotation-powered pulsars. The production of UHECRs in these objects could give a picture that is surprisingly consistent with the latest data measured with the Auger Observatory.