

Random selections

Surface of extremely energetic cosmic rays

‘Violation of the Greisen–Zatsepin–Kuzmin cutoff: A tempest in a (magnetic) teapot? Why cosmic ray energies above 10^{20} eV may not require new physics?’

Glennys R. Farrar and Tsvi Piran

Phys. Rev. Lett., 17 April 2000, **84**, 3527–3530

Extremely energetic (typically 10^{20} eV)

particles constitute a part of cosmic rays that continuously bombard the earth’s atmosphere. The source of these yet-unidentified particles cannot be associated with any plausible ones on the basis of current theories and remains mysterious. Farrar and Piran find that if one were to assume stronger magnetic fields (tens of microgauss) than the ones based on current estimates (typically nanogauss), the energetic particles would follow a

more circuitous path than that along the line-of-sight from earth. On this basis they conclude that the mysterious source may be M17, ‘an active galactic nucleus powered by a billion-sun-sized black hole’. Confirmation of this concept will come if more data reveal certain asymmetry with respect to observations made in the direction of M17.