PHYSICS DEPARTMENT COLLOQUIUM

“AGN jets as UHE neutron & gamma-ray beams (?)”

BY

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Active Galactic Nuclei (AGN) are known as powerful sources of non-thermal radiation in the Universe, with fluxes detected up to TeV (10^{12} eV) energies. Relativistic jets of AGN are believed to be most plausible extragalactic accelerators of cosmic rays (CRs) of ultra high energies (UHE) up to $> 10^{20}$eV. Understanding the physics of AGN jets, which somehow are driven by accreting plasma very close to the supermassive black hole, then break through interstellar medium, and remain collimated propagating straight without any noticeable deceleration through intergalactic medium (IGM) to distances beyond hundreds of kpc, remains a challenge for high energy astrophysics. I will present the results of my recent study which show that these large-scale narrow jets could represent spectacular manifestations of collimated beams of UHE neutrons and gamma-rays produced through photomeson interactions in relativistic compact jets at sub-parsec scales provided only that the compact AGN jets do accelerate CRs to energies beyond 10^{17} eV. I will also discuss both the existing data of AGN observations from radio to X-rays supporting this interpretation of AGN jets, and its implications for theory and observations of jets that could be tested by forthcoming gamma-ray and neutrino detectors. "

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