

Inductive acceleration of UHECRs in sheared relativistic jets

Relativistic outflows carrying large scale magnetic fields have large inductive potential and may accelerate protons to ultra high energies. We discuss a novel scheme of Ultra-High Energy Cosmic Ray acceleration due to drifts in magnetized, cylindrically collimated, sheared jets of powerful active galaxies.

We point out that a positively charged particle carried by such a flow may be in an unstable equilibrium, so that a kinetic drift along the velocity shear would lead to fast, regular energy gain. The key features of the mechanism are (i) the highest rigidity particles are accelerated most efficiently implying the dominance of light nuclei for extragalactic CRs; (ii) acceleration rate increases with energy and does reach the theoretical maximum of inverse relativistic gyro-frequency.

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