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## Extragalactic gamma-ray emission produced by cosmic rays as a tool to explore active galactic nuclei

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In space, ultra-high energy cosmic rays lose energy in interaction with cosmic microwave background. This results in a lack of particles at energies about  $10^{20}$  eV at the Earth (GZK-effect) if cosmic rays come from distances of more than  $\sim 100$  Mpc. Another effect of interaction with cosmic microwave background is electromagnetic cascades that particles initiate in extragalactic space. Assuming that sources of ultra-high energy cosmic rays are active galactic nuclei (AGN) we have calculated cosmic ray energy spectra at the Earth and intensity of cascade quanta produced. We consider several varieties of AGNs including one in which supermassive black hole in AGN is surrounded by a superstrong magnetic field of  $10^{10}$ - $10^{11}$  Gs. Comparing numerical results with spectra measured by Pierre Auger Observatory and Telescope Array and with gamma-ray intensity measured by Fermi LAT we discuss the probable fraction of AGNs surrounded by superstrong magnetic fields.

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