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Simulation of possibility of detecting gamma rays emitted from crab by Alborz-I array

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Abstract

Crab Nebula, as an active source of high energy gamma-rays, is a common standard source used for calibrating different gamma-ray telescopes and observatories. Since gamma rays with energies above 100 TeV from crab have been reported, it is possible to detect gamma rays emitted from this nebula by a suitable ground based detector array. Alborz-I array is designed to study cosmic rays with energies around the knee of the cosmic ray spectrum. In this paper, it is shown that the current location and configuration of Alborz-I make it impossible to detect Crab gamma rays. Our simulation shows that the average rate of gamma particle detection reaches something above 1 gamma particle in 2 years, which is very difficult to distinguish from the cosmic ray background. Finally, some proposals are made to construct an array with the capability of detecting Crab gamma rays.

Keywords: cosmic rays, crab nebula, Alborz observatory, gamma ray astronomy

For full article, refer to the Persian section