

## GAMMA-RAY EMISSION FROM CASSIOPEIA-A PRODUCED BY ACCELERATED COSMIC RAYS

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The kinetic nonlinear model of cosmic ray (CR) acceleration in supernova remnants (SNRs) is used to describe the relevant properties of the Cas A remnant. We use the model of a locally smooth circumstellar medium developed by Borkowski et al (1996) which consists of a tenuous inner bubble, a dense shell of swept up slow red supergiant wind material, and a subsequent red supergiant wind region, in order to reproduce the SNR's observed size, expansion rate and thermal X-ray emission. The values of other physical parameters which influence the CR acceleration are taken to fit the observed synchrotron emission of Cas A in the radio and X-ray bands. The calculated integral  $\gamma$ -ray flux from Cas A is dominated by  $\pi^0$ -decay  $\gamma$ -rays produced by relativistic protons. It extends up to almost 100 TeV and at TeV-energies it considerably exceeds the value  $5.8 \times 10^{-13} \text{ cm}^{-2}\text{s}^{-1}$  detected by the HEGRA collaboration (Aharonian et al. 2001). Possible explanations of this discrepancy are proposed which correspond either to leakage of the highest energy CRs from the remnant already at the current stage or to an unusually high electron to proton ratio for the accelerated CRs.