

## DETAILED MODEL FOR TYCHO'S SUPERNOVA REMNANT AND THE HEGRA UPPER LIMIT FOR TEV $\gamma$ -RAY EMISSION

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The very low upper limit for the TeV  $\gamma$ -ray emission from Tycho's supernova remnant (SNR), recently obtained by the HEGRA collaboration, as well as the observed expansion law and the nonthermal radio and X-ray emission, is discussed in a detailed application of the Yakutsk kinetic, nonlinear acceleration model for SNRs, assuming the Bohm scattering limit. With an upstream B-field strength of  $40 \mu\text{G}$  the SNR kinematics and the observed radio and X-ray spectra are well reproduced. The renormalized TeV  $\gamma$ -ray flux predicted is dominated by the hadronic component, and lies only slightly below the observational upper limit. Due to synchrotron cooling the IC spectrum has the same form. However, future gamma-ray detections up to 10 TeV, possible with the upcoming large Cherenkov arrays, would unambiguously prove a hadronic origin.