PROCEEDINGS OF SCIENCE

Multiwavelength modeling of the Vela pulsar pulses - from Optical light to VHE gamma-rays

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The pulsed radiation from PSR B0833-45 (Vela) has a phased-averaged spectral energy distribution of an apparently simple structure across a wide energy range. However, in narrow energy bands the pulses reveal astonishing complexity of the directional pattern of the radiation. We present the results of a 3D modeling of the Vela radiation properties in the outer-gap scenario. We show how the synchrotron emission as well as the inverse Compton scattering (ICS) of soft photons by secondary $e^{\pm}$-pairs in its magnetic and non-magnetic regimes reproduces qualitatively, and in some cases quantitatively, the observed energy-dependent pulses of Vela. Moreover, we present how ICS of soft synchrotron photons by primary particles can form a pulsed spectral component in the VHE domain. The flux of this component should be of interest to the Cherenkov Telescope Array.

7th Fermi Symposium 2017
15-20 October 2017
Garmisch-Partenkirchen, Germany

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PoS(IFS2017)015