New VHE emitting middle-aged pulsar wind nebula candidates in the extended H.E.S.S. Galactic plane survey data

A. Lemièrè¹,³, A. Djannati-Ataï³, O.C. de Jager², R. Terrier³, Y.A. Gallant⁴, S. Hoppe⁵, S. Carrigan⁶, B. Khelifi⁶, FOR THE H.E.S.S. COLLABORATION⁷.
¹ APC (CNRS, Université Paris VII, CEA, Observatoire de Paris), Paris, France
² Unit for Space Physics, North-West University, Potchefstroom 2520, South Africa
³ Center for Astrophysics, Smithsonian-Harvard Observatory, 60 Garden street, Cambridge, MA, 02138.
⁴ LPTA, Université Montpellier 2, IN2P3/CNRS., Montpellier, France
⁵ Max-Planck-Institut fur Kernphysik, P.O. Box 103980, 69019 Heidelberg, Germany.
⁶ Laboratoire Leprince-Ringuet, IN2P3/CNRS, Ecole Polytechnique, F-91128 Palaiseau, France.
⁷ www.mpi-hd.mpg.de/HESS
alemieri@head.cfa.harvard.edu

Abstract: The H.E.S.S. 2004-2005 survey of the Galactic Plane at energies above 200 GeV had revealed a number of pulsar wind nebula candidates, including the remarkable source HESS J1825-137. Spatially resolved spectral measurements of this source gave the first evidence of an energy-dependent morphology which was interpreted as being due to the cooling of relic electrons cumulated throughout pulsar’s history. Also for a few number of sources the asymmetry of the pulsar with respect to the nebula could be attributed to an asymmetric reverse shock from the associated supernova remnant due to inhomogeneities in the interstellar matter. Subsequently a class of large offset and relic nebula emerged as an outstanding new type of VHE gamma-ray source.

We discuss here the cases of such nebulae in the extended H.E.S.S. Galactic Plane survey data through an energetic criterion taking into account earlier epochs of pulsar injection as well as through investigation of CO and HI data where relevant to search for inhomogeneities.

Results will be given in the post-conference version of the proceedings.