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The intriguing double torus-jet PWN around PSR J0855-4644

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PSR J0855-4644 is a nearby, fast spinning, and energetic radio pulsar spatially coincident with the rim of the supernova remnant RX J0852.0-4622 (aka Vela Jr). XMM Newton observations of the pulsar region have shown an arcmin scale extended emission, the pulsar wind nebula (PWN), around the X-ray counterpart of the pulsar. Here, we present results from the small scale structure of the nebula provided by a Chandra observation of this source. This observation has revealed an arc second scale compact PWN around the pulsar showing a possible double ‘torus+jet’ morphology. This makes it only the third source of its kind, and being an nearby object provides us with the golden opportunity to investigate the physics of equatorial and polar outflows in PWNe. Modeling the geometry of this source is also crucial to understand why no gamma-ray pulsations have been detected by the Fermi-LAT telescope for this high $\dot{E}$ pulsar. In order to constrain the pulsar spin inclination angle, we model the double torus morphology and then compare it with theoretical phase-plots to understand this radio loud, gamma-ray quiet system.

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