

Magnificent in infrared - an unusual isolated neutron star

B. Posselt^{1*}, K. Luhman¹, G. G. Pavlov¹

¹The Pennsylvania State University

RX J0806.4–4123 is a nearby (≈ 250 pc) radio-quiet isolated neutron star (NS) with purely thermal X-ray emission. Its spin-down properties place this NS together with the other 6 members of the so-called the Magnificent Seven between the magnetar and the radio pulsar populations in the $P - \dot{P}$ diagram. Remarkably, there is a near-infrared (NIR) source at the position of RX J0806.4–4123, while no other member of the Magnificent Seven has an NIR detection. This NIR source was first detected with ESO's Very Large Telescope [1] and then confirmed with the Gemini Telescope [2]. Our recent *Hubble* Space Telescope observation shows a rather intriguing NIR source which is much brighter than the expected flux from the NS surface and even might be slightly extended. The existence of an additional far-infrared source very close to RX J0806.4–4123 (detected with the *Herschel* PACS instrument; [3]) accentuates the peculiarity of this NS. We will present our recent observations and discuss possible physical interpretations of the unusual NIR source, such as a possible disk or torus structure around the pulsar.

References

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- [2] Posselt, B., & Luhman, K. L. 2016, *Astronomische Nachrichten*, 337, 576
- [3] Posselt, B., Pavlov, G. G., Popov, S., & Wachter, S. 2014, *Astrophysical Journal Supplement*, 215, 3

*E-mail: posselt@psu.edu