

## On the Extended Emission of the Anomalous X-ray Pulsar 1E 1547.0–5408

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### ABSTRACT

We present an analysis of the extended emission around the anomalous X-ray pulsar 1E 1547.0–5408 using four *XMM-Newton* observations taken with the source in varying states of outburst as well as in quiescence. We find that the extended emission flux is highly variable and strongly correlated with the flux of the magnetar. Based on this result, as well as on spectral and energetic considerations, we conclude that the extended emission is dominated by a dust-scattering halo and not a pulsar wind nebula (PWN), as has been previously argued. We obtain an upper limit on the 2–10 keV flux of a possible PWN of  $4.7 \times 10^{-14}$  erg s<sup>-1</sup> cm<sup>-2</sup>, three times less than the previously claimed value, implying an efficiency for conversion of spin-down energy into nebular luminosity of  $<9 \times 10^{-4}$ .

*Subject headings:* pulsars: individual (1E 1547.0–5408) — stars: neutron — X-rays: stars