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► To cite this version:

B. B. P. Perera, B. W. Stappers, A. G. Lyne, C. G. Bassa, Ismaël Cognard, et al.. Erratum: Evidence for an intermediate-mass black hole in the globular cluster NGC 6624. *Monthly Notices of the Royal Astronomical Society*, 2017, 471 (1), pp.1258. <10.1093/mnras/stx1236>. <insu-01624672>

HAL Id: insu-01624672

<https://insu.hal.science/insu-01624672v1>

Submitted on 3 Nov 2017

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Erratum: Evidence for an intermediate-mass black hole in the globular cluster NGC 6624

by B. B. P. Perera,^{1★} B. W. Stappers,^{1★} A. G. Lyne,^{1★} C. G. Bassa,² I. Cognard,^{3,4}
L. Guillemot,^{3,4} M. Kramer,^{1,5} G. Theureau^{3,4,6} and G. Desvignes⁵

¹Jodrell Bank Centre for Astrophysics, School of Physics and Astronomy, The University of Manchester, Manchester M13 9PL, UK

²ASTRON, the Netherlands Institute for Radio Astronomy, Postbus 2, NL-7990 AA Dwingeloo, the Netherlands

³Laboratoire de Physique et Chimie de l'Environnement et de l'Espace LPC2E CNRS-Université d'Orléans, F-45071 Orléans, France

⁴Station de radioastronomie de Nançay, Observatoire de CNRS/INSU, F-18330 Nançay, France

⁵Max-Planck-Institut für Radioastronomie, Auf dem Hügel 69, D-53121 Bonn, Germany

⁶Laboratoire Univers et Théories LUTH, Observatoire de Paris, CNRS/INSU, Université Paris Diderot, 5 place Jules Janssen, F-92190 Meudon, France

Key words: errata, addenda – black hole physics – stars: neutron – pulsars: individual: PSR B1820–30A – globular clusters: individual: NGC 6624.

The paper ‘Evidence for an intermediate-mass black hole in the globular cluster NGC 6624’ was published in MNRAS, 468, 2114 (2017).

When estimating the model-dependent minimum mass of the intermediate-mass black hole (IMBH) of 60 000 M_{\odot} in Section 5, we used the separation of 0.15 pc for PSR J1823–3021C from the globular cluster centre, as given in Peuten et al. (2014, see table 2 therein). Unfortunately, this value is incorrect and the correct separation is 0.34 pc based on the position given in Table 1 (also see Lynch et al. 2012). This correct distance measurement changes the result presented in Fig. 9 in the published version, and the modified figure based on the positions given in Table 1 is appended here. Note that this does not affect any other results presented in the paper, in particular, the IMBH mass estimation obtained through orbital dynamics given in Section 4.

If the measured accelerations (i.e. \dot{P}/P) of PSRs J1823–3021B and C are assumed to be solely dynamically induced and the intrinsic spin-down contribution is negligible (see equation 1), then the required mass of the IMBH to explain the acceleration of these sources becomes as massive as the cluster mass. This implies that the intrinsic spin-down of these two pulsars is important and their dynamically induced accelerations are smaller than the measured accelerations. Therefore, we exclude these two pulsars in the estimation of the IMBH mass limit in Section 5. Assuming that the dynamically induced acceleration of the low-mass X-ray binary (LMXB) is approximately equal to the observed value, as used in Peuten et al. (2014), we estimate that the minimum model-dependent mass of the IMBH is $\sim 20\,000\,M_{\odot}$. Thus, the $\sim 60\,000\,M_{\odot}$ mass limit mentioned in Section 5 and in the Abstract in the published version has to be replaced by this correct model-dependent mass limit of $\sim 20\,000\,M_{\odot}$. We also note that the mass of the IMBH used to produce Fig. 8 was $19\,000\,M_{\odot}$ and this mass is approximately equal to the correct mass limit given above. Therefore, the result presented in Fig. 8 in the published version is valid.

ACKNOWLEDGEMENTS

We thank Mark Gieles and Federico Abbate for noticing this error in the separation of pulsar C used in the published version.

* E-mail: bhakthiperera@gmail.com (BBPP); ben.stappers@manchester.ac.uk (BWS); andrew.lyne@manchester.ac.uk (AGL)

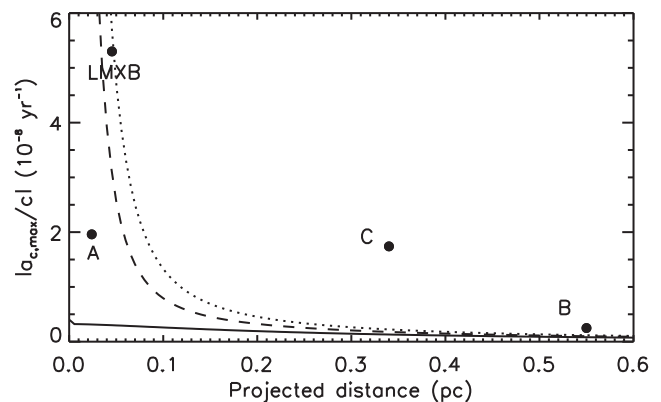


Figure 9. Cluster model predicted maximum acceleration as a function of projected distance from the centre (calculated from Table 1). Different curves represent the acceleration for different IMBH masses in the centre: no IMBH (solid), $10\,000\,M_{\odot}$ (dashed) and $20\,000\,M_{\odot}$ (dotted). The measured accelerations of PSRs B1820–30A, B1820–30B and B1820–30C, and the LMXB 4U 1820–30 are marked appropriately. To be consistent with the measured acceleration of PSR B1820–30A and the LMXB, the cluster model requires the minimum mass of the central IMBH to be $20\,000\,M_{\odot}$.

REFERENCES

- Lynch R. S., Freire P. C. C., Ransom S. M., Jacoby B. A., 2012, *ApJ*, 745, 109
Peuten M., Brockamp M., Küpper A. H. W., Kroupa P., 2014, *ApJ*, 795, 116