Using debris disk observations to infer substellar companions orbiting within or outside a parent planetesimal belt (Corrigendum)

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In Appendix B of the original article we investigated the sensitivity of JWST/MIRI for the filters F1000W and F2100W. We transformed sensitivities valid for an unresolved point source into surface brightness sensitivities using Eq. (12) from Glasse et al. (2015). For the filter F1000W, the resulting detection limit is given in the original article as \( \approx 4.2 \times 10^{-3} \text{Jy arcsec}^{-2} \). This limit should have been read \( \approx 3.5 \times 10^{-6} \text{Jy arcsec}^{-2} \). This is only a typographical error, and the correct value was used for the analysis. For the filter F2100W, the resulting detection limit is given in the original article as \( \approx 4.2 \times 10^{-4} \text{Jy arcsec}^{-2} \). However, in our analysis, a limit of \( \approx 3.5 \times 10^{-3} \text{Jy arcsec}^{-2} \) was used. This value was erroneously calculated; the correct limit is \( \approx 7.9 \times 10^{-6} \text{Jy arcsec}^{-2} \). This detection limit is lower than the used limit, and hence the performance of JWST/MIRI at a wavelength of 21 \( \mu \text{m} \) was underestimated.

Consequently, the exposure times required to detect structures in the surface brightness distributions using JWST/MIRI at 21 \( \mu \text{m} \) are shorter than what is given in the original article. To detect intermediate surface brightness values of 5 \( \times 10^{-3} \text{Jy arcsec}^{-2} \) with a SNR of 3 an exposure time of \( t_{\text{exp}} \approx 2.5 \text{min} \) is required (instead of the \( t_{\text{exp}} \approx 10 \text{min} \) given in the original article).

The third panel of Fig. B.2 shows horizontal lines with too high sensitivity limits. This is corrected here in Fig. 1. Using the correct sensitivity limits, an exposure time of \( t_{\text{exp}} = 1 \text{h} \) is sufficient to detect emission with surface brightness values corresponding to isophotes with semimajor axes of up to \( a \sim 190 \text{au} \div 220 \text{au} \) with a \( S/N \) of 3. With \( t_{\text{exp}} = 5 \text{h} \), all halo regions investigated can be detected with a \( S/N \) of at least 3.

The red contour lines in Figs. B.3 and B.4 are valid for an exposure time of \( t_{\text{exp}} \approx 14 \text{min} \) (instead of the \( t_{\text{exp}} = 1 \text{h} \) given in the original article). For the system n-i-M4, an exposure time of \( t_{\text{exp}} \geq 2 \text{h} \) would be required to significantly detect the spiral pattern (instead of the \( t_{\text{exp}} \geq 8 \text{h} \) given in the original article).

The error only affects the conclusions about the feasibility of detecting certain disk features with JWST/MIRI at a wavelength of 21 \( \mu \text{m} \): a shorter exposure time than what is stated in the original article is required. The main conclusions of the original article remain unchanged.

References

Glasse, A., Rieke, G. H., Bauwens, E., et al. 2015, PASP, 127, 686

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