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Physical Properties of Binary Brown Dwarfs

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Astrometric observations of binary brown dwarfs yield dynamical masses of the components independently of theoretical models. We give an update on our long-term high-resolution spectroscopic and photometric monitoring programme of spatially resolved binary brown dwarfs using ground-based adaptive optics and the Hubble Space Telescope. We present current orbital fits, including refined dynamical mass estimate of the Kelu-1 AB system. The results seem to support the previously reported trend that evolutionary and atmospheric models might underestimate the mass of very-low-mass stars and brown dwarfs.

Alternatively, additional, thus far unresoled system components (i.e. a higher degree of multiplicity) could explain the unexpectedly high dynamical mass estimates. In the case of Kelu-1 AB, we present potential spectroscopic evidence for a third system component. The confirmation of this third system component would resolve the reported discrepancy between evolutionary models and dynamical mass estimates. This might make Kelu-1 AB the first pure brown dwarf triple system discovered so far.