

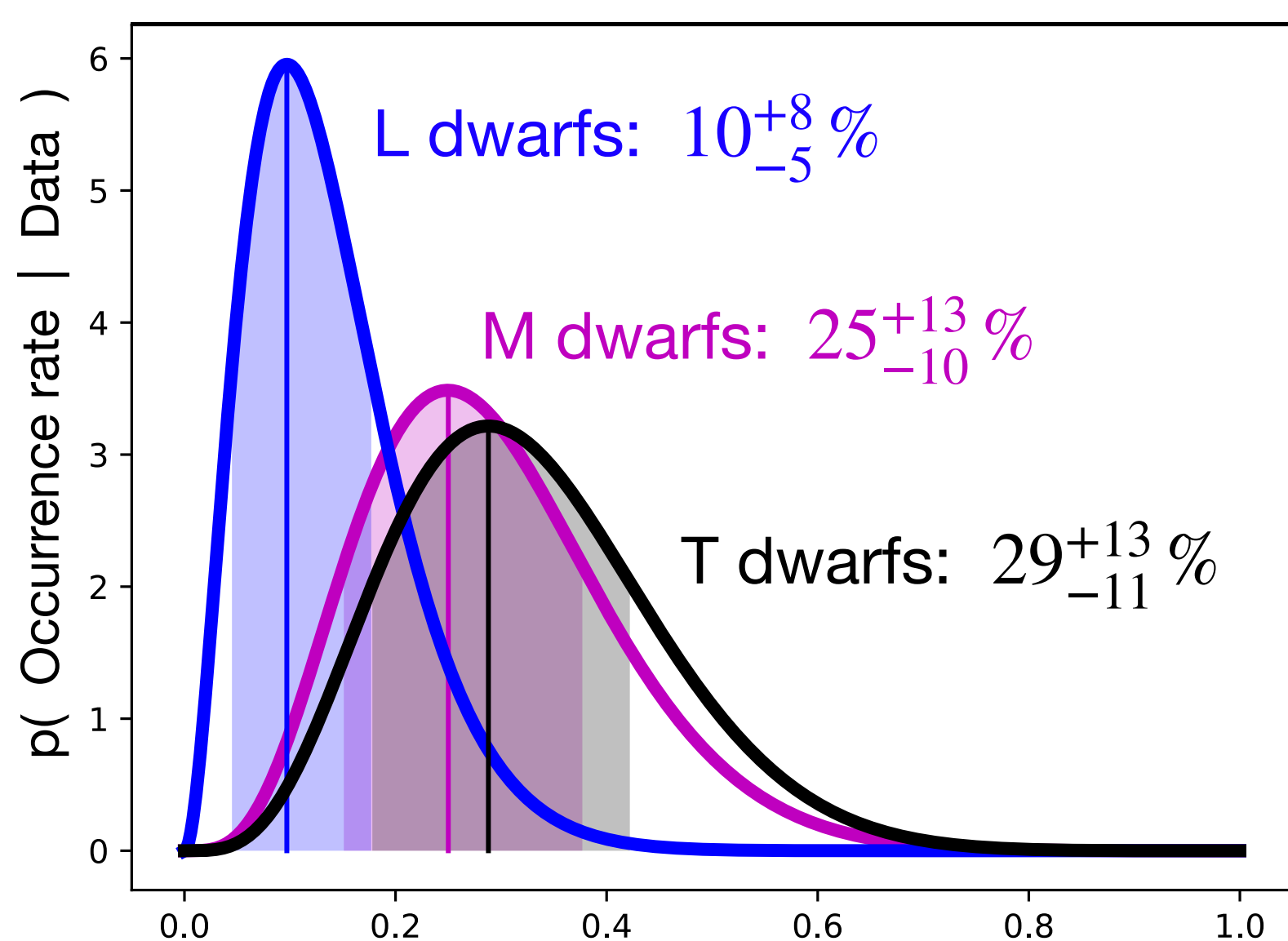
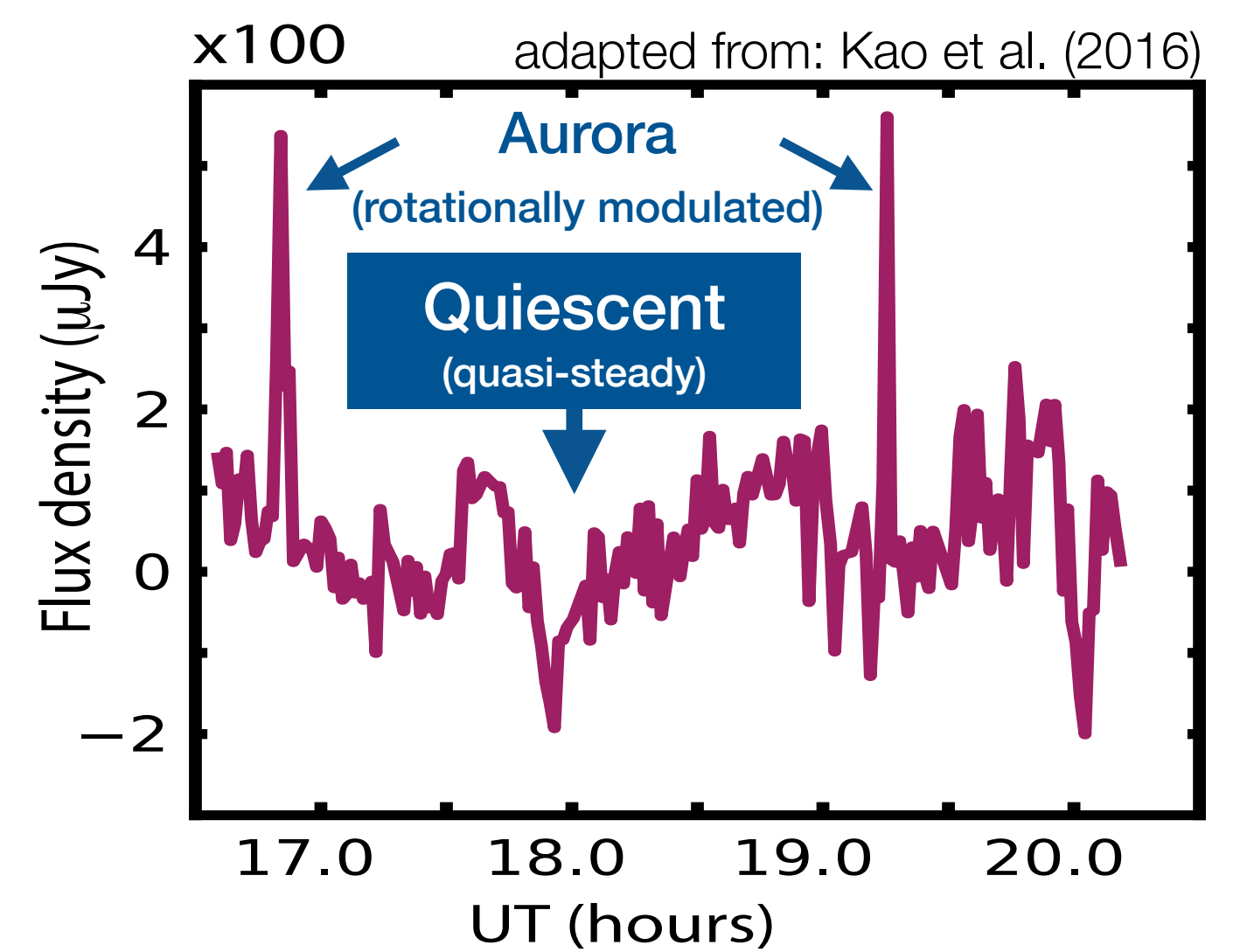
Probing Substellar Magnetospheres with Statistical Studies of Brown Dwarf Quiescent Radio Emission

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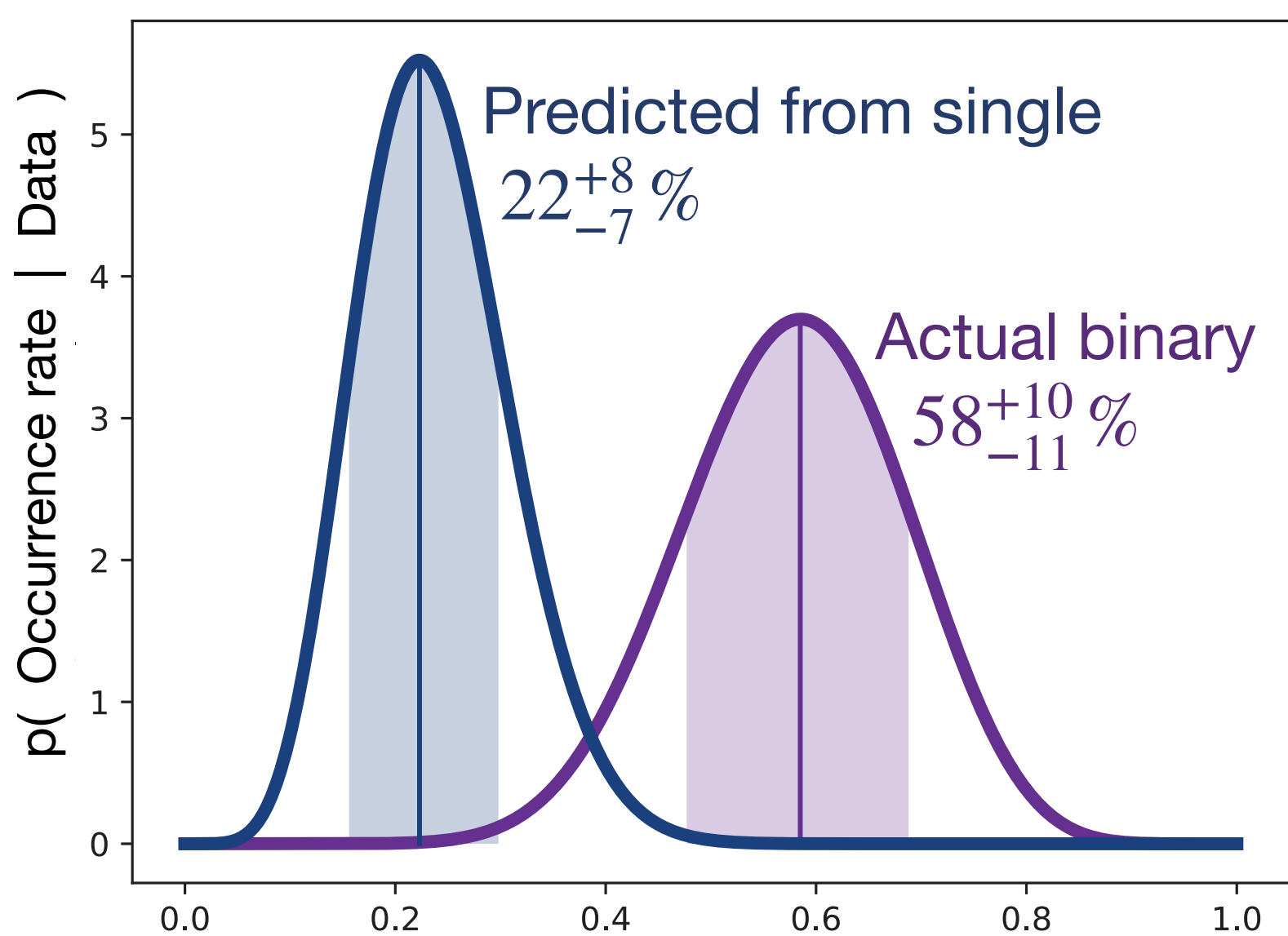
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Like planets, brown dwarfs emit both auroral and non-auroral magnetospheric radio emission. Detections of brown dwarf radio aurorae demonstrate that their thermal energy budgets significantly under-predict their magnetic fields (Kao et al. 2016, 2018). What else contributes to the stronger-than-predicted fields that we observe for brown dwarfs? **Statistical studies of non-auroral “quiescent” radio emission can identify object properties that correlate with their magnetic activity.**



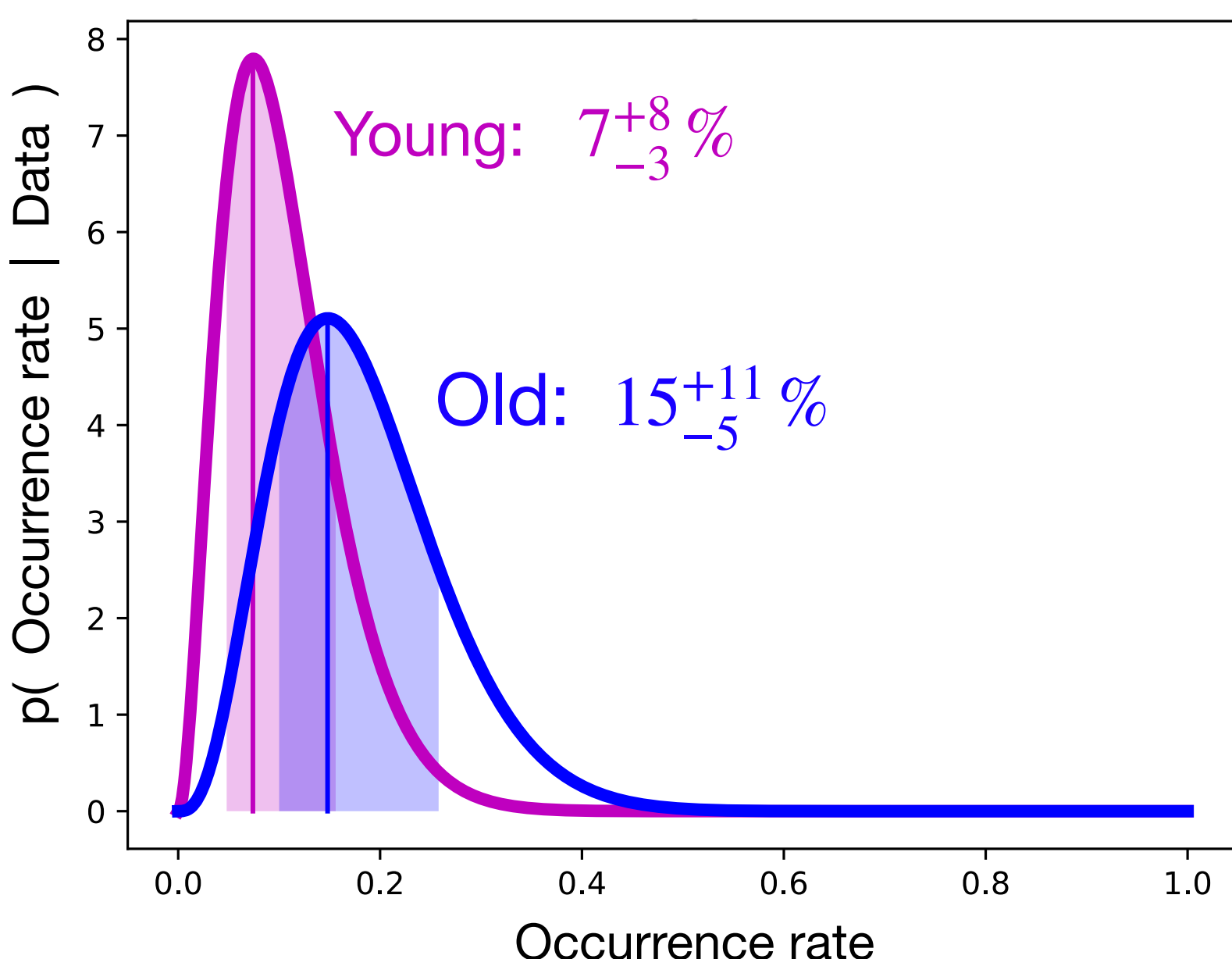
L dwarfs: a suppressed radio occurrence rate?

In Kao & Shkolnik (submitted), we develop and numerically validate a new Bayesian framework for calculating the occurrence rate of any quasi-steady astrophysical emission or absorption. We apply this framework to 82 M dwarfs, 39 L4 or later dwarfs, and 23 T dwarfs and find tentative evidence that L dwarfs may have a suppressed radio occurrence rate compared to M and T dwarfs.



Binarity enhances quiescent radio occurrence rates.

In Kao & Pineda (submitted), we adapt this framework to binary systems and show that even when we account for effective temperature, brown dwarf and ultracool dwarf binary systems are much more likely to emit radio emission than what their single-object counterparts predict.



Youth does not strongly affect magnetism.

In Kao & Shkolnik (in prep), we combine literature data with a new survey of young brown dwarfs and find that youth does not actually enhance the quiescent radio occurrence rate of brown dwarfs.

radio brown dwarfs:
binarity helps, not youth —
late L dwarfs are strange.