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Shaping the Brown Dwarf Desert: Predicting the Primordial Brown Dwarf Binary Distributions from Turbulent Fragmentation PETER JUMPER, ROBERT FISHER, University of Massachusetts Dartmouth — Brown dwarfs are failed stars, with masses too low to undergo hydrogen nuclear burning. While the first incontrovertible brown dwarf was detected observationally in 1995, their formation mechanism and the origin of many of their physical properties remain open questions. The absence of brown dwarf companions in close orbits (less than several AU) to solar-type primary stars in binary systems poses a major problem. Astronomers have termed this sparsity of nearby brown dwarf companions in binary systems the brown dwarf desert. We demonstrate that direct fragmentation of the parent gaseous turbulent giant molecular cloud cores naturally gives rise to widely-separated stellar-brown dwarf binary systems. We also show that this fragmentation produces narrowly-separated brown dwarf - brown dwarf binary systems. Additionally, these results support the observation that the minimum binding energy of systems increases with decreasing system mass.

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