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On planar bodies of variable density that float in equilibrium in all orientations

In 1935, Ulam asked if a convex body of uniform density which floats in equilibrium in every orientation must be a sphere. The answer has been shown to be negative for bodies of constant density 1/2. In this talk we show that any star body may be made to float in equilibrium in all orientations if it has a specific variable density, which we determine explicitly. We also consider the case, in two dimensions, of a non-compactly supported, non-radial density that achieves the same result. This is joint work with Stephanie Juntunen.