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Thermodynamic signatures of half-quantum vortices in $p + ip$ Josephson junction arrays[1] GRAHAM KRAHN, UC Riverside, KIRILL SHTENGEL, Associate Professor of Physics, UC Riverside — A very interesting type of excitation in a chiral p-wave superconductor is a half-quantum vortex. As the name suggests, they carry half of a superconducting flux quantum, and are only possible in superconductors with spin-triplet pairing. An astonishing feature of these excitations is the presence of topologically protected Majorana zero modes. Single half-quantum vortices were recently discovered (J. Jang et al, Science **331**(6014): 186-188) in superconducting mesoscopic rings made of Sr_2RuO_4, yet to this date they have not been observed in macroscopic samples. We propose a method for detecting half-quantum vortices in Josephson junction arrays, which could host a large number of these vortices. Contrary to a 3D setting, we argue that half-quantum vortices can be energetically preferable in quasi-2D chiral spin-triplet superconductors. As a result, half-quantum vortices rather than full vortices could drive a Berezinskii-Kosterlitz-Thouless transition (which manifests itself as a resistive transition). We propose to look for their signatures by comparing transition temperatures in $p + ip$ Josephson junction arrays in a transverse magnetic field in both unfrustrated and frustrated cases.

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