Abstract Submitted
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Topological Josephson effect for arbitrary values of the tunnel coupling in the Kitaev model[1] FLAVIO NOGUEIRA, ILYA EREMIN, Institut für Theoretische Physik III, Ruhr-Universität Bochum, Universitätsstraße 150, 44801 Bochum, Germany — We investigate the Josephson effect for a setup with two lattice quantum wires featuring fused Majorana boundary modes at the tunnel junction. We show exactly that additional degeneracies occur when the size of the Josephson coupling attains a certain critical value, thus introducing additional energy level crossings. The physical consequences of these additional level crossings are discussed. It is shown that for this critical coupling the Andreev levels can be cast in the form $E_{m\sigma} = 2\sigma\sqrt{2}w\cos(\phi/6 - \pi m/3)$, where $m = -1, 0, 1$ and $\sigma = \pm 1$. The exact Josephson current exhibits the characteristic 4π periodicity along with additional features related to the extra crossings of Andreev levels at the critical value of the tunnel coupling.

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