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**Disorder in a quantum spin liquid: the Kitaev honeycomb model with vacancies**

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We address the effects of disorder in the Kitaev honeycomb model, focussing on the interplay of disorder and strong interactions in a quantum spin liquid. It is shown that nonmagnetic impurities bind a quantum of the emergent gauge flux. We find the formation of a local moment, which leads to a local magnetic response near the impurity which is parametrically larger than in the bulk. The magnetic response of a pair of impurities can be parametrically larger than that of an isolated one, and can in particular dominate the magnetic response of the system. The role of such impurities as diagnostic of the spin liquid state are emphasized – most remarkably, they provide a direct signature of the emergent gauge field.

<sup>1</sup>In collaboration with Adam Willans and John Chalker (Oxford University): Phys. Rev. Lett. 104, 237203 (2010); Phys. Rev. B 84, 115146 (2011).