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Repulsively bound atom pairs in an optical lattice.

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Three dimensional optical lattices represent an interesting environment for fundamental research with ultracold atoms. We have observed a novel kind of stable bound state of two atoms which is based on repulsion rather than attraction between the particles [1]. We will explain how these lattice-induced repulsively bound atom pairs come about and discuss their interesting properties. Ensembles of repulsively bound pairs are described by a Bose-Hubbard model and can be used to study strongly correlated condensed matter physics. [1] K. Winkler et al., Nature 441, 853 (2006).