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Abstract for an Invited Paper
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Beyond Standard Fermi Hubbard Models¹

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In my talk I will focus on novel physics and novel quantum phases that are expected in a system of ultracold fermionic atoms with long range interactions, such dipolar ones. I will discuss various terms in the Hubbard model that, normally neglected, have to be included in the theory. These terms involve both lowest band physics, as well as higher bands. I will describe several exemplary effects that new terms may lead to: spontaneous breaking of symmetries, such as time-reversal, smectic-like metal phases, spontaneous formation of exotic lattices and 3D textures.

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