

One-dimensional two-orbital $SU(N)$ ultracold fermionic quantum gases at incommensurate filling for a low-energy approach

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We investigate the zero-temperature phase diagram of two-orbital $SU(N)$ fermionic models at incommensurate filling which are directly relevant to strontium and ytterbium ultracold atoms loading into a one-dimensional optical lattice.

Using a low-energy approach that takes into account explicitly the $SU(N)$ symmetry, we find that a spectral gap for the nuclear-spin degrees of freedom is formed for generic interactions. Several phases with one or two gapless modes are then stabilized which describe the competition between different density instabilities.

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