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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.

Auteur principal: M. FROMHOLZ, Pierre (LPTM Cergy)

Co-auteurs: Prof. LECHEMINANT, Philippe (LPTM Cergy); M. BOIS, Valentin (LPTM Cergy)

Orateurs: M. FROMHOLZ, Pierre (LPTM Cergy); M. BOIS, Valentin (LPTM Cergy)

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