# Multicomponent Skyrmion lattices and their excitations

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**Résumé**

We study quantum Hall ferromagnets with a finite density of topologically charged spin textures in the presence of internal degrees of freedom such as spin, valley, or layer indices, so that the system is parametrized by a $d$-component spinor field. In the absence of anisotropies we find a hexagonal Skyrmion lattice that completely breaks the underlying $SU(d)$ symmetry with the low-lying excitation spectrum separating into $d\hat{}2$-1 gapless acoustic magnetic modes and a magnetophonon. The ground state charge density modulations, which inevitably exist in these lattices, vanish *exponentially* in $d$. We discuss the role of effective mass anisotropy for $SU(3)$-valley Skyrmions relevant to experiments with AlAs quantum wells. Here we find a transition which breaks a sixfold rotational symmetry of the triangular lattice, followed by the formation of a square lattice at large values of anisotropy strength.

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