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Coulomb Correlations in Landau Levels: Novel Squeezed States and Optical Transitions[1] ALEXANDER TODD, LIONEL CUGGIA, CSU Bakersfield, CA 93311, ALEXANDER DZYUBENKO, CSU Bakersfield, CA 93311; General Physics Institute, Moscow 119991, Russia — We report on a novel theoretical formalism developed for dealing with Coulomb interparticle interactions in composite charged complexes in Landau levels. The formalism is based on a unitary transformation of the exact interacting Hamiltonian and describes condensation of an infinite number of degrees of freedom into new squeezed vacuum and excited states. The squeezed states are characterized by built-in correlations between particles and form a complete basis of states, which is compatible with axial rotations and magnetic translations. We introduce and discuss novel and surprisingly simple exact optical selection rules that govern inter- and intra-band transitions of charged composite complexes in magnetic fields. We report on applications of the developed formalism to studying optical transitions and charged collective excitations in a magnetically quantized 2D electron gas.

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