Barcelona Analysis Seminar **2025–2026**

Date: Thursday December 18, 2025
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Room: UB iA (Universitat de Barcelona)

Spectral problems for many body systems: energy of one- and two-component Bose gases

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In a famous 1947 paper, Bogoliubov developed a theory for the spectral analysis of Hamiltonians describing the microscopic behavior of dilute quantum Bose gases. Since then, a major line of research in mathematical physics has been the rigorous justification for, and refinement of, Bogoliubov's theory. In this talk, we review historical milestones regarding the thermodynamic energy of dilute Bose gases and present recent developments. Specifically, we derive a two-term energy expansion for a two-component Bose gas subject to repulsive, pairwise intra- and inter-species interactions. We compare this result to the single-component case, demonstrating its correspondence with the celebrated Lee-Huang-Yang formula and highlighting its universality with respect to the interaction potentials.