

## **Matteo Bruno: Spin Structures and Cosmology in Loop Quantum Gravity**

*Thursday, May 7, 2026 4:45 PM (30 minutes)*

In this talk, we analyze the role of the spin structure in the Ashtekar–Barbero–Immirzi formulation of General Relativity. While not often taken into account in the full theory, it becomes crucial in cosmology. In particular, by employing a suitable notion of homogeneous connection, in the spirit of Wang’s theorem, we classify the homogeneous Ashtekar variables by computing the corresponding moduli space. We demonstrate that the resulting classification is consistent with Loop Quantum Cosmology only when the spin structure is properly taken into account. Finally, we outline a quantization preserving local gauge symmetry in the spirit of Loop Quantum Gravity, where quantum states arise as cylindrical functions with enhanced symmetry properties.