



CYCLE DE CONFÉRENCES

Séminaire général de physique de l'Institut Polytechnique de Paris  
Département de physique de l'École polytechnique

# A NEW WINDOW INTO THE STRONG FORCE



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The strong interaction, the most powerful yet least intuitive of the fundamental forces, governs how quarks and gluons combine to form nuclei, shaping the visible matter of our universe. Despite its fundamental importance, this interaction remains poorly constrained. While high-energy collider experiments have long illuminated the energy frontier, a complementary approach has recently emerged at CERN's LHCb (Large Hadron Collider beauty) experiment: operating in fixed-target mode, where a single high-energy proton or ion beam interacts with injected gas targets. This innovative setup provides a unique laboratory to explore Quantum Chromodynamics, the theory of the strong interaction in previously inaccessible regions of phase space.

In this seminar, recent results in studies enabled by the LHCb fixed-target program will be presented, and the instrumental and methodological advances that have made these measurements possible will be discussed. Future perspectives for fixed-target physics and their role in unveiling the inner workings of the strong force will also be highlighted.



*The LHCb fixed target.*

**THURSDAY  
DECEMBER  
18, 2025**

**5 pm - 6:15 pm  
LECTURE HALL  
PIERRE FAURRE  
ÉCOLE POLYTECHNIQUE**

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