

Progetto per borse CSN3 per gli studenti della laurea magistrale	
Titolo del progetto:	Searching for the most strange di-baryons predicted by Lattice QCD at the LHC
Esperimento/Sigla proponente:	ALICE
Laboratorio ospitante:	LNF - INFN
Contact person presso il laboratorio	Alessandra Fantoni alessandra.fantoni@lnf.infn.it Oton Vazquez Doce oton.vd@cern.ch
Periodo previsto:	Maggio 2025 - Ottobre 2025
Sezioni e tutor proponenti:	LNF Alessandra Fantoni, Oton Vazquez Doce
Descrizione attività (max 1000 caratteri):	<p>A di-baryon is a six-quark state formed by two baryons bound by the strong interaction. So far, there is evidence of the existence of only one di-baryon: the deuteron, composed of a proton and neutron.</p> <p>Physicists have long searched for the existence of different types of di-baryons, and advanced Lattice QCD calculations predict the existence of proton-Ω and the Ω-Ω di-baryons. Remarkably, the Ω baryon is composed of three strange quarks, so the Ω-Ω would be a very exotic system with six strange quarks.</p> <p>The ALICE Collaboration is able to provide unique data on the interaction of baryons, even for the unstable and strange Ω baryon. The analysis of the correlation function in momentum space of pairs of particles produced in the same LHC collisions reveals the strength and characteristics of their mutual interactions and can be used to disentangle the possible existence of the predicted di-baryons.</p>
Altre indicazioni (max 500 caratteri):	<p>The activity comprehends the identification of Ω baryons via their weak decay into charged particles that are identified by the ALICE detector, the measurement of the p-Ω and Ω-Ω correlation function and its comparison with the predictions by the Lattice QCD calculations and other models.</p> <p>The proposed activity includes the analysis and interpretation of data from proton-proton and heavy nucleus collisions collected by ALICE at the LHC during Run 2 and 3 (current run).</p>
Facility che il laboratorio ospitante mette a disposizione:	Mensa e foresteria; computer; uffici
Note:	L'esperienza svolta presso il laboratorio ospitante può essere parte integrante di un progetto tesi magistrale.