

Presentazione del dott. Maximiliano Puccio
Dottorato di Ricerca in Fisica - XXIX Ciclo
Università degli Studi di Torino

Dottorando: Maximiliano Puccio

Relatore: Massimo Masera

Titolo della tesi:

Study of the production of nuclei and anti-nuclei at the LHC with the ALICE experiment

Durante il triennio di dottorato il dott. Maximiliano Puccio ha seguito e sostenuto l'esame relativo ai seguenti corsi della Scuola:

- Parallel and distributed computing, docente: Prof. Marco Aldinucci
- Hands-on Fitting and Statistical Tools for Data Analysis, docente: Dr. Mario Pelliccioni
- Data Analysis Techniques, docente: Prof. Luciano Ramello
- Calorimetry in particle physics experiments, docente: Dr. Roberta Arcidiacono

L'attività di ricerca del dott. Maximiliano Puccio ha riguardato l'analisi dei dati raccolti dall'esperimento ALICE e lo sviluppo di algoritmi di ricostruzione per la fase di Upgrade dell'esperimento.

Il dott. Maximiliano Puccio ha analizzato la produzione di deutone e anti-deutone in collisioni tra nuclei pesanti estendendo ad alto momento trasverso le misure attualmente disponibili. Questo tipo di studi sono interessanti per capire quali siano i meccanismi di produzione di nuclei leggeri in collisioni tra nuclei pesanti.

Il candidato è anche responsabile per lo sviluppo degli algoritmi di ricostruzione del vertice primario di interazione tra le particelle del fascio del Large Hadron Collider in ALICE e dell'algoritmo di tracciamento per l'upgrade del tracciatore interno di ALICE.

Infine, nello scorso anno il dott. Maximiliano Puccio ha lavorato presso il CERN dedicando parte del proprio tempo alla manutenzione e alla supervisione della presa dati del rivelatore Silicon Drift Detector (SDD) dell'esperimento ALICE.

Durante la sua attività di ricerca il dott. Maximiliano Puccio ha mostrato notevole spirito di iniziativa, senso critico, indipendenza nell'organizzare

il proprio lavoro e grande capacità di collaborare attivamente in un team internazionale. I risultati della sua analisi sono originali e sono attualmente in corso di pubblicazione

Pertanto si esprime grande apprezzamento per il lavoro svolto dal Dott. Maximiliano Puccio durante il triennio del Dottorato di Ricerca.

Torino, data

Il tutore

Firma

Relazioni su invito

- *Tracking in high multiplicity events*; VERTEX 2016; Sep 25–30 2016, La Biodola
- *Overview of ALICE results on anti-nuclei and anti-hypernuclei*; EMMI Workshop: Anti-matter, hyper-matter and exotica production at the LHC; Jul 20–22 2015, CERN

Relazioni a conferenze

- *Studio della produzione di materia (iper-)nucleare a LHC con l'esperimento ALICE*; Incontro Nazionale di Fisica Nucleare (INFN) 2016; Nov 14–16 2016, Frascati
- *Nuclei and anti-nuclei production in Heavy Ion collisions*; Large Hadron Collider Physics (LHCP) 2015; Aug 31–Sep 5 2015, St. Petersburg
- *Deuteron and anti-deuteron production at LHC with the ALICE experiment*; Incontri di Fisica delle Alte Energie (IFAE) 2015; Apr 8–10 2015, Roma

Scuole

- 11th Hadron Collider Physics Summer School; Aug 11–20 2016, Fermilab
- International School of Subnuclear Physics; Jun 24–Jul 3 2015, Erice
- Efficient Scientific Computing 2014; Oct 19–25 2014, Bertinoro

Workshops e altre conferenze

- Quark Matter 2015; Sep 27–Oct 3 2015, Kobe
- International Workshop for Future Challenges in Tracking and Trigger Concepts; May 12–14 2014, Frankfurt

Visite e stages

- Cooperation Associate presso CERN (01/01/16 - 31/12/16)

Elenco delle pubblicazioni

- [1] The ALICE collaboration. Centrality dependence of high- p_T D meson suppression in Pb–Pb collisions at $\sqrt{s_{NN}}=2.76$ TeV, year = 2015, journal = JOURNAL OF HIGH ENERGY PHYSICS. 2015:1–24.
- [2] The ALICE collaboration. Event-by-event mean p_T fluctuations in pp and Pb–Pb collisions at the LHC. *THE EUROPEAN PHYSICAL JOURNAL. C, PARTICLES AND FIELDS*, 74:3077–3077, 2014.
- [3] The ALICE collaboration. Freeze-out radii extracted from three-pion cumulants in pp, p–Pb and Pb–Pb collisions at the LHC. *PHYSICS LETTERS. SECTION B*, 739:139–151, 2014.
- [4] The ALICE collaboration. Performance of the ALICE experiment at the CERN LHC. *INTERNATIONAL JOURNAL OF MODERN PHYSICS A*, 29:1430044–1430044, 2014.
- [5] The ALICE collaboration. Suppression of Υ (1S) at forward rapidity in Pb–Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV. *PHYSICS LETTERS. SECTION B*, 738:361–372, 2014.
- [6] The ALICE collaboration. Centrality dependence of inclusive J/ Ψ production in p-Pb collisions at $\sqrt{s_{NN}}=5.02$ TeV. *JOURNAL OF HIGH ENERGY PHYSICS*, 2015:1–33, 2015.
- [7] The ALICE collaboration. Centrality dependence of particle production in proton–proton collisions at $\sqrt{s_{NN}}=5.02$ TeV. *PHYSICAL REVIEW. C, NUCLEAR PHYSICS*, 91:064905–064905, 2015.
- [8] The ALICE collaboration. Charged jet cross sections and properties in proton-proton collisions at $\sqrt{s} = 7$ TeV. *PHYSICAL REVIEW D, PARTICLES, FIELDS, GRAVITATION, AND COSMOLOGY*, 91:112012–112012, 2015.
- [9] The ALICE collaboration. Coherent $\Psi(2S)$ photo-production in ultra-peripheral PbPb collisions at $\sqrt{s_{NN}}=2.76$ TeV. *PHYSICS LETTERS. SECTION B*, 751:358–370, 2015.
- [10] The ALICE collaboration. Coherent ρ_0 photoproduction in ultra-peripheral Pb–Pb collisions at $\sqrt{s_{NN}}=2.76$ TeV. *JOURNAL OF HIGH ENERGY PHYSICS*, 2015:095–095, 2015.

- [11] The ALICE collaboration. Forward-backward multiplicity correlations in pp collisions at $\sqrt{s} = 0.9, 2.76$ and 7 TeV. *JOURNAL OF HIGH ENERGY PHYSICS*, 2015:097–097, 2015.
- [12] The ALICE collaboration. Inclusive photon production at forward rapidities in proton–proton collisions at $\sqrt{s} = 0.9, 2.76$ and 7 TeV. *THE EUROPEAN PHYSICAL JOURNAL. C, PARTICLES AND FIELDS*, 75:146–146, 2015.
- [13] The ALICE collaboration. Inclusive, prompt and non-prompt J/Ψ production at mid-rapidity in Pb–Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV. *JOURNAL OF HIGH ENERGY PHYSICS*, 2015:051–051, 2015.
- [14] The ALICE collaboration. Measurement of charged jet production cross sections and nuclear modification in p–Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV. *PHYSICS LETTERS. SECTION B*, 749:68–81, 2015.
- [15] The ALICE collaboration. Measurement of charm and beauty production at central rapidity versus charged-particle multiplicity in proton–proton collisions at $\sqrt{s} = 7$ TeV. *JOURNAL OF HIGH ENERGY PHYSICS*, 2015:148–148, 2015.
- [16] The ALICE collaboration. Measurement of dijet k_T in p–Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV. *PHYSICS LETTERS. SECTION B*, 746:385–395, 2015.
- [17] The ALICE collaboration. Measurement of jet quenching with semi-inclusive hadron-jet distributions in central Pb–Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV. *JOURNAL OF HIGH ENERGY PHYSICS*, 2015:170–170, 2015.
- [18] The ALICE collaboration. Measurement of jet suppression in central Pb–Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV. *PHYSICS LETTERS. SECTION B*, 746:1–14, 2015.
- [19] The ALICE collaboration. Measurement of pion, kaon and proton production in proton–proton collisions at $\sqrt{s} = 7$ TeV. *THE EUROPEAN PHYSICAL JOURNAL. C, PARTICLES AND FIELDS*, 75:226–226, 2015.
- [20] The ALICE collaboration. One-dimensional pion, kaon, and proton femtoscopy in Pb–Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV. *PHYSICAL REVIEW. C, NUCLEAR PHYSICS*, 92:054908–054908, 2015.

- [21] The ALICE collaboration. Precision measurement of the mass difference between light nuclei and anti-nuclei. *NATURE PHYSICS*, pages 3432–3432, 2015.
- [22] The ALICE collaboration. Production of inclusive $\Upsilon(1S)$ and $\Upsilon(2S)$ in p–Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV. *PHYSICS LETTERS. SECTION B*, 740:105–117, 2015.
- [23] The ALICE collaboration. Production of $\Sigma^\pm(1385)$ and $\Xi(1530)$ in proton-proton collisions at $\sqrt{s} = 7$ TeV. *THE EUROPEAN PHYSICAL JOURNAL. C, PARTICLES AND FIELDS*, 75:1–1, 2015.
- [24] The ALICE collaboration. Rapidity and transverse-momentum dependence of the inclusive J/ Ψ nuclear modification factor in p–Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV. *JOURNAL OF HIGH ENERGY PHYSICS*, 2015:55–55, 2015.
- [25] The ALICE collaboration. Two-pion femtoscopy in p–Pb collisions at $\sqrt{s_{NN}}=5.02$ TeV. *PHYSICAL REVIEW. C, NUCLEAR PHYSICS*, 91:034906–034906, 2015.
- [26] The ALICE collaboration. ${}^3_\Lambda\text{H}$ and ${}^3_\Lambda\bar{\text{H}}$ production in collisions at $\sqrt{s_{NN}}=2.76$ TeV. *PHYSICS LETTERS. SECTION B*, 754:360–372, 2016.
- [27] The ALICE collaboration. Anisotropic Flow of Charged Particles in Pb–Pb Collisions at $\sqrt{s_{NN}}=5.02$ TeV. *PHYSICAL REVIEW LETTERS*, 116:132302–132302, 2016.
- [28] The ALICE collaboration. Centrality dependence of pion freeze-out radii in Pb–Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV. *PHYSICAL REVIEW C*, 93:024905–024905, 2016.
- [29] The ALICE collaboration. Centrality dependence of the nuclear modification factor of charged pions, kaons, and protons in Pb–Pb collisions at $\sqrt{s_{NN}}=2.76$ TeV. *PHYSICAL REVIEW C*, 93:034913–034913, 2016.
- [30] The ALICE collaboration. Centrality evolution of the charged-particle pseudorapidity density over a broad pseudorapidity range in Pb–Pb collisions at $\sqrt{s_{NN}}=2.76$ TeV. *PHYSICS LETTERS. SECTION B*, 754:373–385, 2016.
- [31] The ALICE collaboration. Direct photon production in Pb–Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV. *PHYSICS LETTERS. SECTION B*, 754:235–248, 2016.

- [32] The ALICE collaboration. Elliptic flow of muons from heavy-flavour hadron decays at forward rapidity in Pb–Pb collisions at $\sqrt{s_{\text{NN}}} = 2.76$ TeV. *PHYSICS LETTERS. SECTION B*, 753:41–56, 2016.
- [33] The ALICE collaboration. Event-shape engineering for inclusive spectra and elliptic flow in Pb–Pb collisions at $\sqrt{s_{\text{NN}}}=2.76$ TeV. *PHYSICAL REVIEW C*, 93:034916–034916, 2016.
- [34] The ALICE collaboration. Forward-central two-particle correlations in p–Pb collisions at $\sqrt{s_{\text{NN}}} = 5.02$ TeV. *PHYSICS LETTERS. SECTION B*, 753:126–139, 2016.
- [35] The ALICE collaboration. Measurement of D_s^+ production and nuclear modification factor in Pb–Pb collisions at $\sqrt{s_{\text{NN}}} = 2.76$ TeV. *JOURNAL OF HIGH ENERGY PHYSICS*, 2016:082–082, 2016.
- [36] The ALICE collaboration. Measurement of electrons from heavy-flavour hadron decays in p-Pb collisions at $\sqrt{s_{\text{NN}}}=5.02$ TeV. *PHYSICS LETTERS. SECTION B*, 754:81–93, 2016.
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- [38] The ALICE collaboration. Production of light nuclei and anti-nuclei in pp and Pb–Pb collisions at energies available at the CERN Large Hadron Collider. *PHYSICAL REVIEW C*, 93:024917–024917, 2016.
- [39] The ALICE collaboration. Pseudorapidity and transverse-momentum distributions of charged particles in proton-proton collisions at $\sqrt{s} = 13$ TeV. *PHYSICS LETTERS. SECTION B*, 753:319–329, 2016.
- [40] The ALICE collaboration. Study of cosmic ray events with high muon multiplicity using the ALICE detector at the CERN Large Hadron Collider. *JOURNAL OF COSMOLOGY AND ASTROPARTICLE PHYSICS*, 2016:032–032, 2016.
- [41] The ALICE collaboration. Transverse momentum dependence of D-meson production in Pb–Pb collisions at $\sqrt{s_{\text{NN}}} = 2.76$ TeV. *JOURNAL OF HIGH ENERGY PHYSICS*, 2016:081–081, 2016.