

R_{AA} of electrons from open beauty-hadron decays
in Pb–Pb collisions at $\sqrt{s_{NN}}=5.02$ TeV with ALICE

Jonghan Park

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Probes of High-Energy Nuclear Collisions

Flash Talk (ID #63)

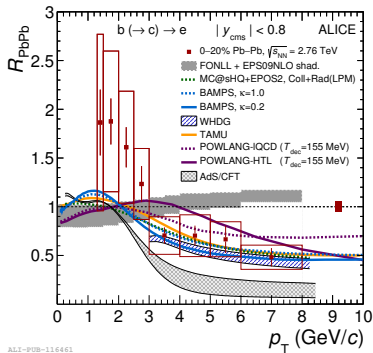


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- **Heavy flavors** (c & b quarks)
 - effective probes to investigate the QGP [1]
- **Energy loss in the medium**
 - Expected to be mass dependence [2]

$$(\Delta E_g > \Delta E_{u,d,s} > \Delta E_c > \Delta E_b)$$
 - Evaluate medium effects

$$R_{AA} = \frac{1}{\langle T_{AA} \rangle} \frac{dN_{AA}/p_T}{d\sigma_{pp}/p_T}$$
- ALICE measured beauty-decay electrons in Pb–Pb at 5.02 TeV collected in 2015
 - with higher precision
 - with different centrality classes
 - extending the high- p_T (up to 26 GeV/c)



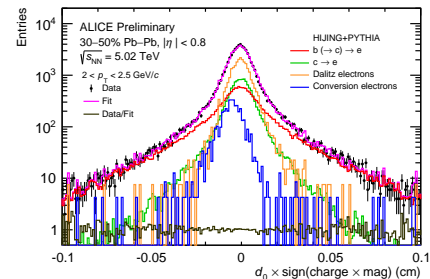
ALI-PUB-116461

ALICE Collaboration JHEP 07 (2017) 052

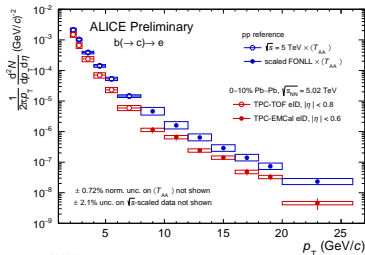
- **Template fit method**

- Use specific characteristic of beauty-hadron decay electrons (large decay length of B hadrons : $c\tau \approx 500 \mu\text{m}$)
- Based on maximum likelihood approach [3]
- Templates from Monte Carlo simulations (HIJING+PYTHIA)
Beauty, Charm, Dalitz, and Conversion electrons

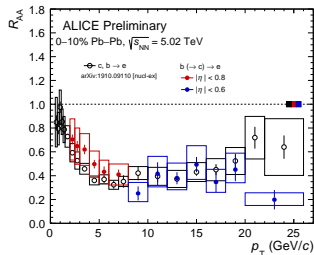
- **Efficiency correction** with Monte Carlo simulations



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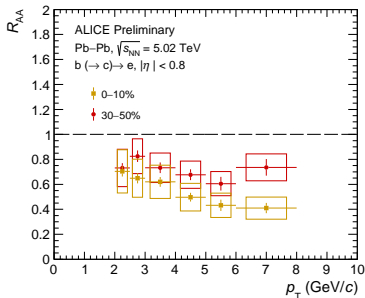


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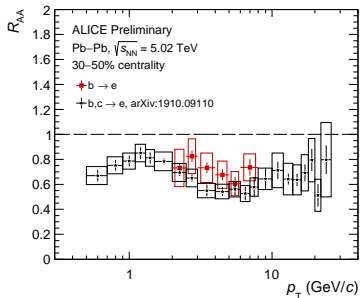


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- Beauty-decay electrons up to 26 GeV/c in central Pb–Pb collisions
- Suppression of spectrum in Pb–Pb with respect to the scaled pp reference
→ beauty quarks are suppressed for $p_T > 2$ GeV/c
- Compare with electrons from heavy-flavor hadron decays [4]
→ beauty quarks are less suppressed than charm quarks at low p_T
→ Both R_{AA} merge at high p_T since beauty quarks are dominant [5]



ALICE-PREL-330244



ALICE-PREL-330280

- Beauty-decay electron's R_{AA} in semi-central collisions up to 8 GeV/c is compared with the one in central collisions and with the R_{AA} of heavy-flavor decay electrons [4]
 - Similar behaviors observed as central collisions
- **Outlook**
 - Extend to high p_T using calorimeter performances
 - Compute R_{CP} to estimate correlated systematic uncertainties in different centrality cases

- [1] A. Andronic et al., Eur. Phys. J. C76 no.3, (2016) 107
- [2] Y. Dokshitzer and D. Kharzeev, Phys. Lett. B 519 (2001) 199
- [3] R. Barlow and C. Beeston, Comput. Phys. Commun. 77, 2 (1993) 219-228
- [4] ALICE Collaboration, Phys. Lett. B 804 (2020) 135377
- [5] ALICE Collaboration, Phys. Lett. B 721 (2013) 13-23