D meson production and long-range azimuthal correlation in 8.16 TeV *p*+Pb collisions with ATLAS

Motivation

Heavy flavors (originate from charm and bottom quarks):

- Large mass
- Most from hard scattering, pQCD calculable

Significant production suppression and flow in Pb+Pb collisions

Crucial to study HF production and flow in small systems to fully understand the interaction between HF and QGP

D meson reconstruction

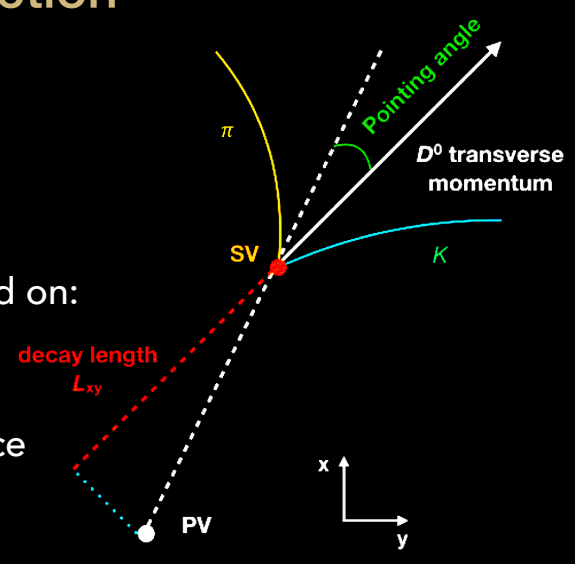
Two analysis channels:

$D^0 \to K\pi$

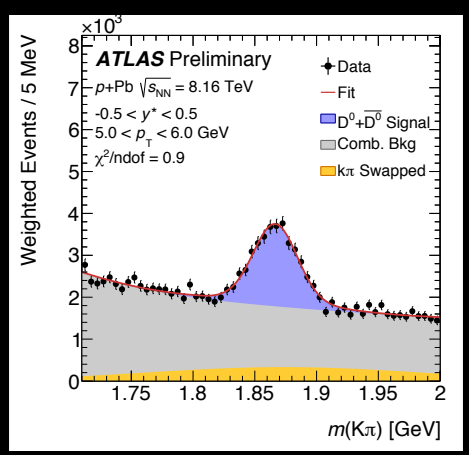
$D^* \to D^0\pi \to K\pi\pi$

$K\pi$ vertex optimized based on:

- vertex probability
- pointing angle
- decay length significance



D meson Yields



D^0 $m(K\pi)$ fit:
Signal — CB+Gaussian;
Swap Bkg — Gaussian;
Comb. Bkg — poly.

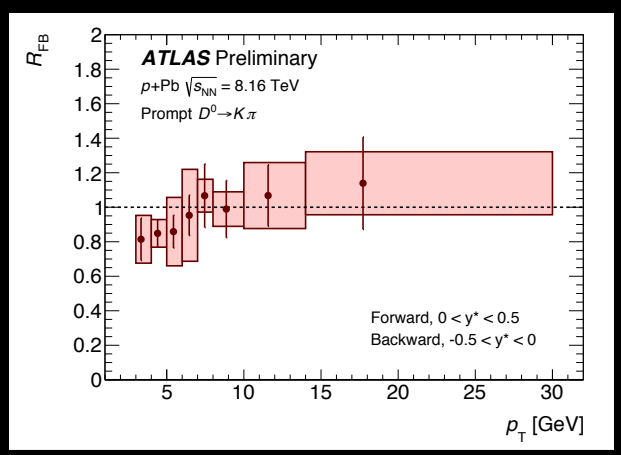
Systematics in yields:

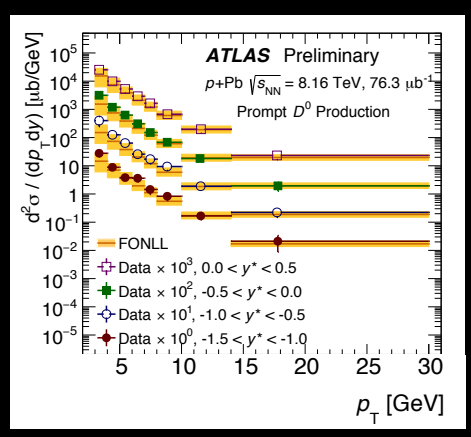
- selection efficiency
- fit model
- track reco. efficiency
- trigger efficiency
- acceptance
- non-prompt subtraction
- luminosity

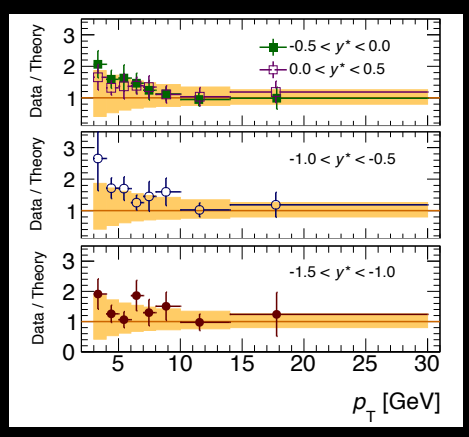
$$\frac{d^2\sigma}{dp_T dy^*} = \frac{f_{\text{prompt}} \times N_{\text{fit}}^D}{\Delta p_T \times \Delta y \times B \times P \times L}$$

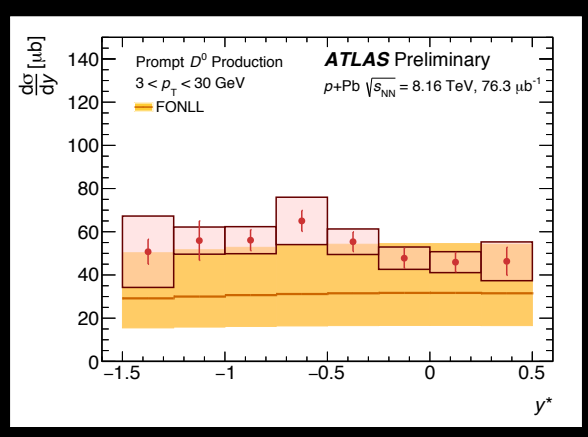
f_{prompt}: prompt *D* fraction
P: MB trigger prescale
L: integrated luminosity
B: branching fraction

FONLL scaled by A_{Pb} = 208, no significant modification wrt. FONLL









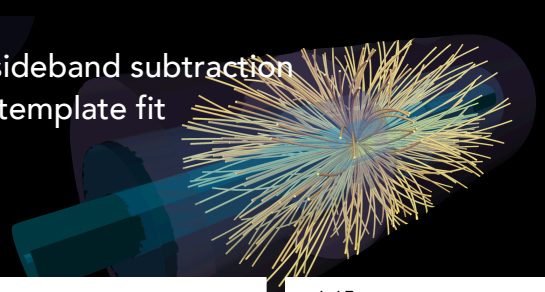
$$R_{FB}(p_T; |y^*| < 0.5) = \frac{d\sigma/dp_T(0 < y^* < 0.5)}{d\sigma/dp_T(-0.5 < y^* < 0)}$$

Probe cold nuclear matter effects. No significant modification at forward compared to backward

D-hadron* Correlation

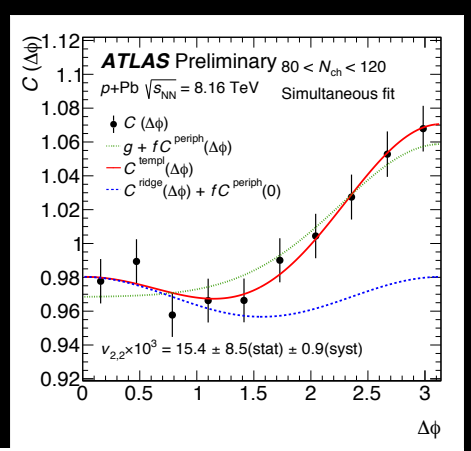
Inclusive *D**—hadron correlation

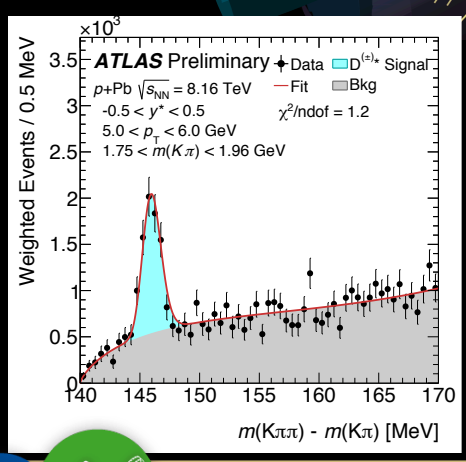
- $|\Delta\eta| > 1$
- fake D*: sideband subtraction
- non-flow: template fit

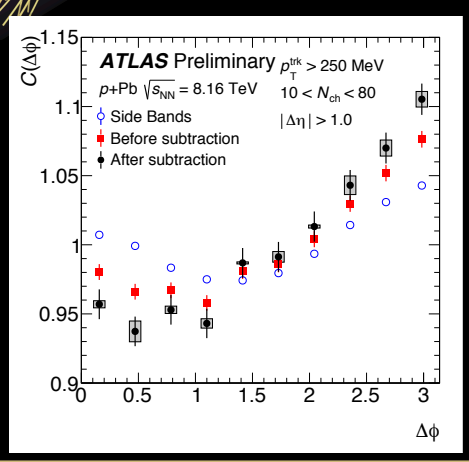


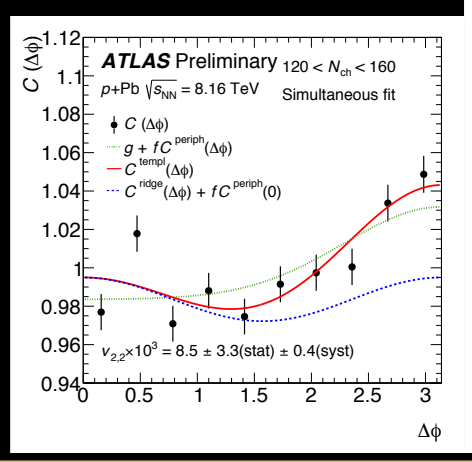
$$C^{\text{templ}}(\Delta\phi) = C^{\text{ridge}}(\Delta\phi) + FC^{\text{periph}}(\Delta\phi)$$
$$= G\left(1 + 2v_{2,2}\cos(2\Delta\phi)\right) + FC^{\text{periph}}(\Delta\phi)$$

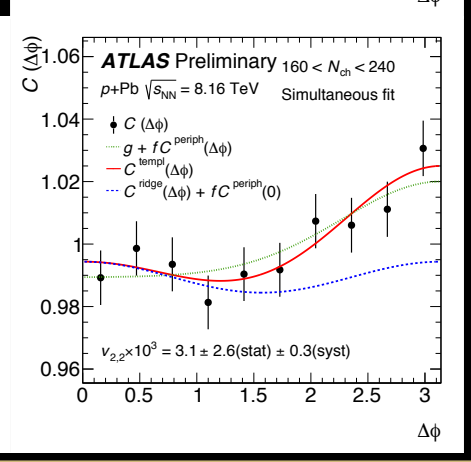
- Simultaneous template fit for low and high multiplicity bins.
- Non-zero $v_{2,2}$ *D**-hadron correlation coefficients is favored
- Final results of D^0 and D^* v_2 and v_3 would be available soon











Venezia 2018 Quark Matter

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