Discussion session:
Light-ion beams at the LHC

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Light-ion (O) beams at the LHC

Machine conditions:

- **Performance estimates** based on plausible parameters but uncertainties likely to remain until run (split in SPS? etc)

→ **O beam production in injector**: tests in May to clarify budget and schedule.

- Set-up beam limit on total intensity allows shorter commissioning

- **beam energy and optics as PbPb Run3** is (from machine) the most efficient setup
  → 6.37 TeV if PbPb at 5.02 TeV

- **Novel beam effects with light ions**:
  → transmutation effect? constraints?

Data-taking options:

"Pilot"-run (3-4 days of operations):

- Run 3 Pb-Pb setup and optics
- L_{int} (OO) ~ 0.5 nb^{-1} (1 fill in 1 day)

"Pilot" run (6-8 days of operations):

- **L_{int} (OO) > ~ 0.5 nb^{-1}** (~ 1-2 days)
  - ALICE levelled, less lumi for LHCb
- **L_{int} (pO)** (~ 2-3 days)
  - **~ 1.5-2 nb^{-1} to LHCf/ATLAS, LHCb**
  - ~5 nb^{-1} to ALICE/CMS

- **"fast"VdM calibration (~20m) → 5-10%**
- **VdM calibration (~2h per exp) → 1.5-3%**
- **energy tuning: extra ~2/3 days**

OO physics:

- **quenching vs flow** in small systems
- flow and initial state effects
- quarkonia regeneration, strangeness ..

pO physics:

- **LHCf/LHCb for cosmic rays studies**
- studies of nPDF modifications at low-mid p_T (D, J/Ψ), flow, ..

→ **vdM choice**: impact physics program e.g. R_{AA} normalization
→ **Different c.m. energies**: interpolation?
→ **trasmutation?**

Higher statistics pO/OO runs?

→ high-p_T probes (e.g. W, Z, di-jets, γ) for nPDF, quenching, ..

- Not feasible/foreseen in Run3/4
  → Run3/4 O as learning experience in view of light/intermediate ion runs in Run5

BACKUP