He3JET update in IR4

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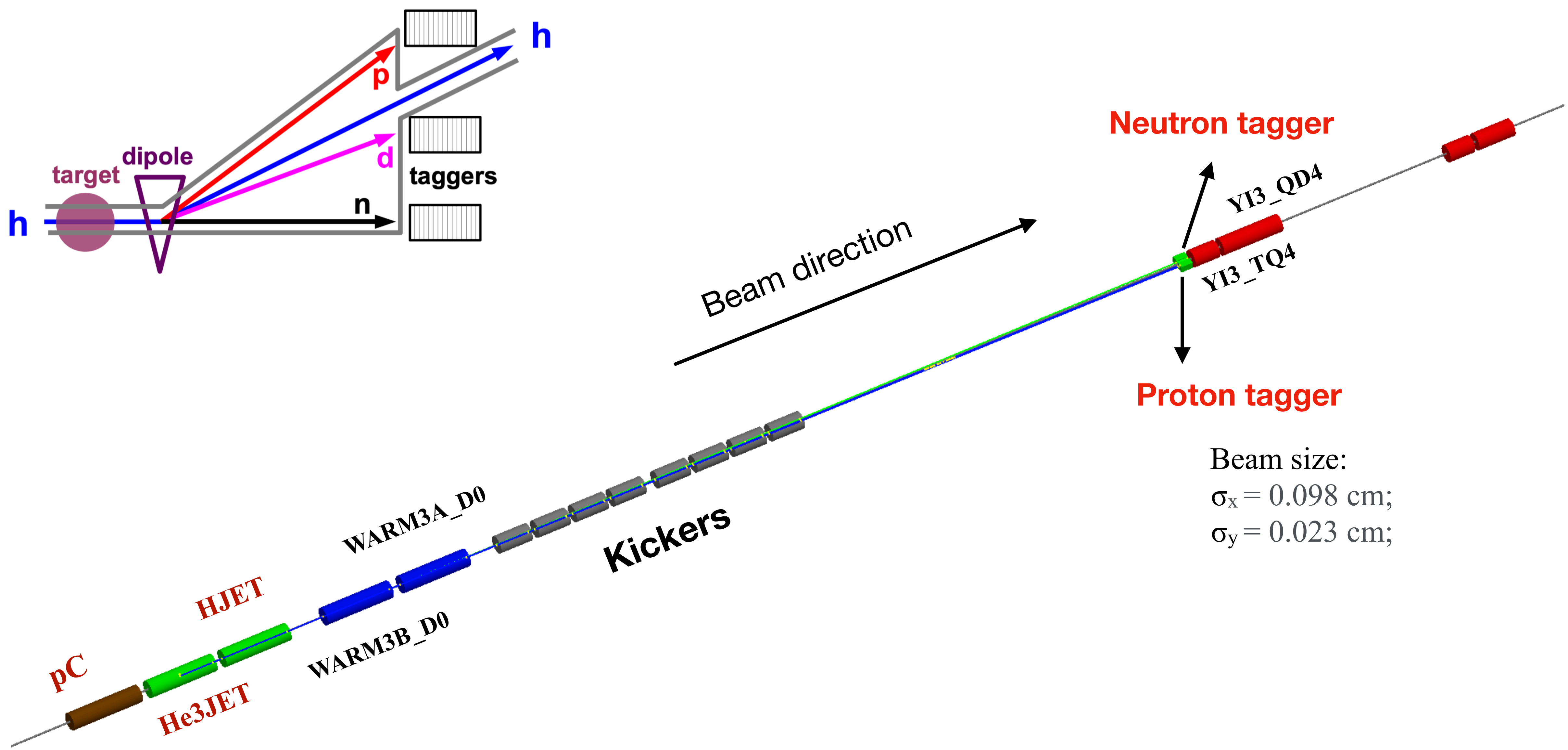
The layout of the HJET in IR4

- We need dipole and drift space to separate the breakup fragments from the beam line.



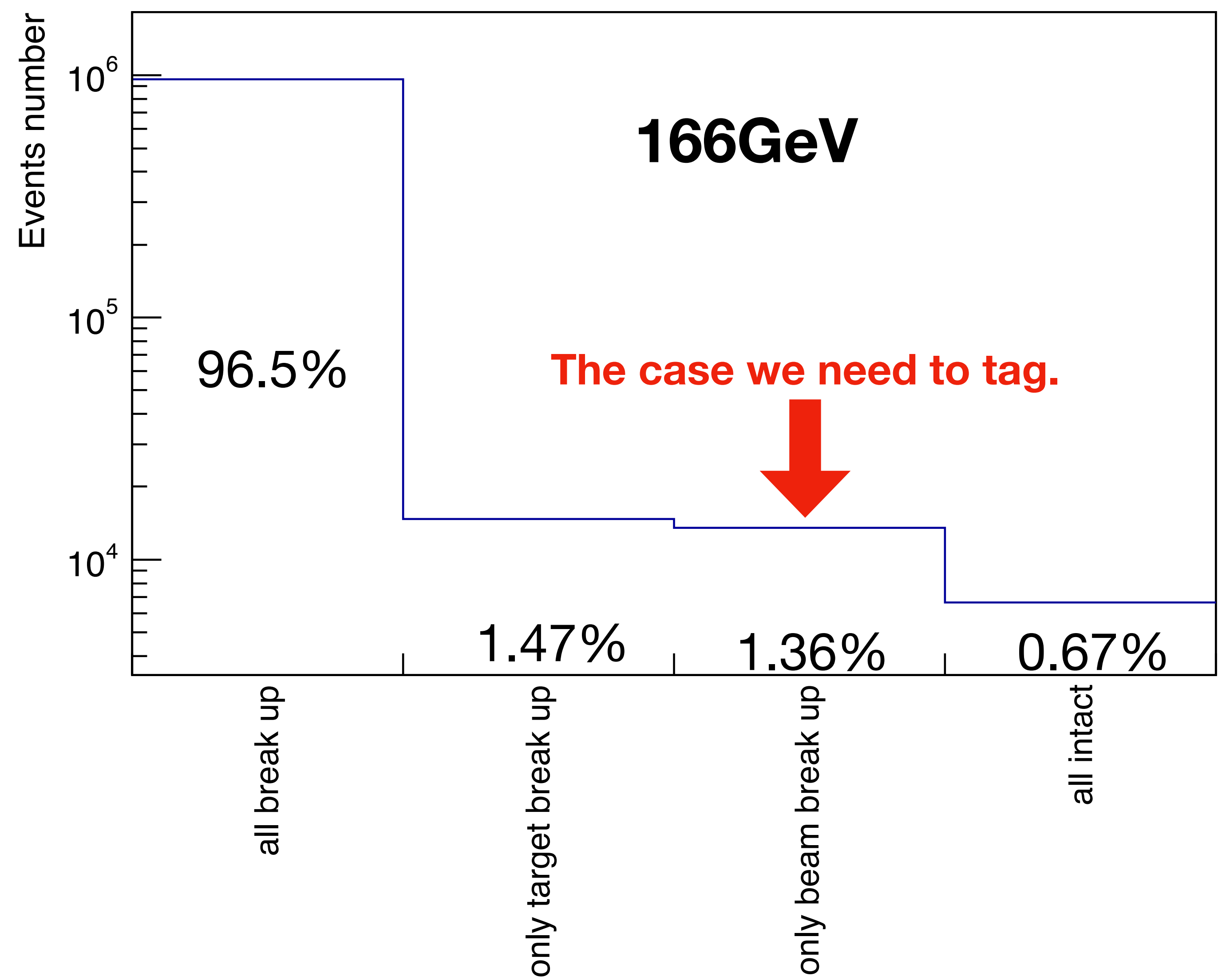
Beam size:
$\sigma_x = 0.098$ cm;
$\sigma_y = 0.023$ cm;

- Proposed placement of Stochastic Cooling Kickers between the He3JET and the tagger.
- Two WARM dipoles positioned after the HJET, instead of one.

He3-He3 events in DMPJet model

- We use DMPJet model to simulate He3-He3 fix target collision;
- Four cases in the DMPJet events:

  ✓All He3 break up;
  ✓Only target He3 break up
  ✓Only beam He3 break up
  ✓All He3
- We need to tag the events that only the beam He3 break up;



- **Energy Threshold for Tagging**: Only events with deposited energy > 5 GeV at the tagger are triggered.
- **Beam Pipe Design Variations**: Examined circular beam pipes with varying diameters (7 cm, 6 cm, 5 cm) and materials (Aluminum, Copper, Stainless Steel).
- **Impact of Beam Pipe Size and Material**:
- Smaller diameters allow the tagger to be positioned closer to the beam, improving tagging accuracy.
- Thinner and Aluminum-based pipes enhance tagging efficiency.
- **Energy Dependence on Tagging Efficiency**: Tagging efficiency is lower for 110 GeV compared to 166 GeV.
- We tested the all-intact events, with less than 0.05% of events triggering the taggers.

Tagging efficiency

166 GeV

Aluminum (1mm) ⌀ 7cm	91.9%
Cooper (1mm) ⌀ 7cm	86.1%
Stainless Steel (1mm)	87.5%
Aluminum (1mm) ⌀ 6cm	93.4%
Aluminum (1mm) ⌀ 5cm	94.9%
Aluminum (1.5mm) ⌀ 6cm	88.7%

110 GeV

Aluminum (1mm) ⌀ 7cm	84.0%
Aluminum (1mm) ⌀ 6cm	87.1%
Aluminum (1mm) ⌀ 5cm	89.2%