EP UV long-pulse beams with added leg flexibility

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Mingsheng Wei
General Atomics

Report material input from: Farhat Beg (UCSD), Mingsheng Wei, Richard Stephens (GA), Vladimir Smalyuk (LLNL), Bob Heeter (LLNL), Dustin Froula (LLE), and many people in the audience
UV LP beam configuration on EP

- Currently, all four long pulse beams (B1 – B4) are from 23° beam cone
- Or, two long pulse beams (B3 & B4) from 23° ports with short pulse BL and SL

OLUG recommendation on LP:

- More flexible beam legs – strong request of opposing beam operation from both internal and external users
- Facility has identified routing options (Beam2 to P44, Beam 4 to P59) and included in FY13-17 LLE proposed activities

- 100-ps UV pulse, 100 J/beam (already available)

- Bring all the beams to the full performance (see LLE website for the latest update)
Opposing UV beam operation facilitates fast ignition electron transport study in well characterized plasmas

Study of fast electron transport into warm dense plasmas

- UV beam drives shock to assemble hot dense plasmas in foam or solid
- Characterize shock propagation and compression with side-on x-ray radiography
- Systematic investigation of 10 ps kJ high intensity EP BL beam produced fast electron transport into hot dense plasmas
- Characterize fast electrons transport by $K\alpha$, bremsstrahlung x-ray radiation and side-on proton probe measuring intense fields

* M. Key, Physics of Plasmas 14, 055502 (2007)
# M.S. Wei et al., PRL (under revision)

US FI consortium team + CELIA, Univ. Bordeaux
Opposing beams configuration will allow variety types of HED science experiments on OMEGA EP

- **Study of RT instability**
  - 3 UV beam driver (10 ns, 15-20 kJ)
  - Opposing beam produce bright backlight source for characterizing RT instability
  - Framing camera at TIM 12 to record the x-ray image with good access

- **Study of LTE & non-LTE plasma**
  - Opposing beams to create LTE & non-LTE plasmas
  - Probes with BL and SL with extremely high temporal (10 ps) and spatial resolution enable detail measurement of \( n_e, T_e \), opacity of LTE or non-LTE expanding sample
    - precise validation of time-dependent atomic kinetics along experimentally-measured rho-T paths