Ion motion and hosing suppression in plasma-based accelerators
[C. Benedetti et al., LBNL]

- Bunch parameters of interest for a plasma-based collider trigger hosing and ion motion
- Bunch-induced ion motion as a way to generate betatron frequency chirp that suppresses hosing
- Emittance degradation associated with ion motion eliminated by proper bunch shaping

Centroid evolution

Emittance evolution

- NO ion motion → hosing, large emittance growth (beam breakup)
- WITH ion motion + LIN. matched → hosing suppressed, but emittance growth (+60%) from ion motion
- WITH ion motion + NONLIN. matched (equilibrium bunch) → hosing suppressed and no emittance growth

1Mehrling et al., PRL (2018)
2Benedetti et al, PRAB (2017)