Beam Loading

Can the correlation between charge asymmetry and position differences be explained by beam loading?

Observed correlation between Aq and x,y position differences are:

X: 0.3 nm/ppm

Y: -1.5 nm/ppm

è Total kick ~ 1.53nm/ppm

RHWP and IA scans show consistent correlations

Therefore, 100ppm charge asymmetry would cause ~150nm position difference.

Is this consistent with beam loading?

Charge asymmetry – Energy difference corralation is ~ -1.1 eV/ppm

Therefore,

-1.1 eV/ppm * 100ppm * dispersion_at_target= 150 nm

Dispersion_at_target = 1.4nm/eV = 1.4mm/MeV

~ 47 mm/%_change_in_E

This beam loading factor seems too large and inconsistent with the tune capable at JLab.