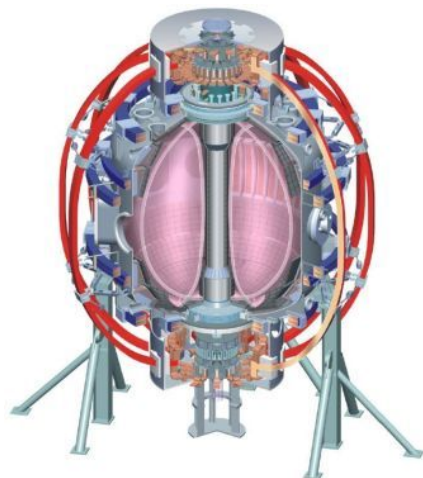


New tangential FIDA diagnostic

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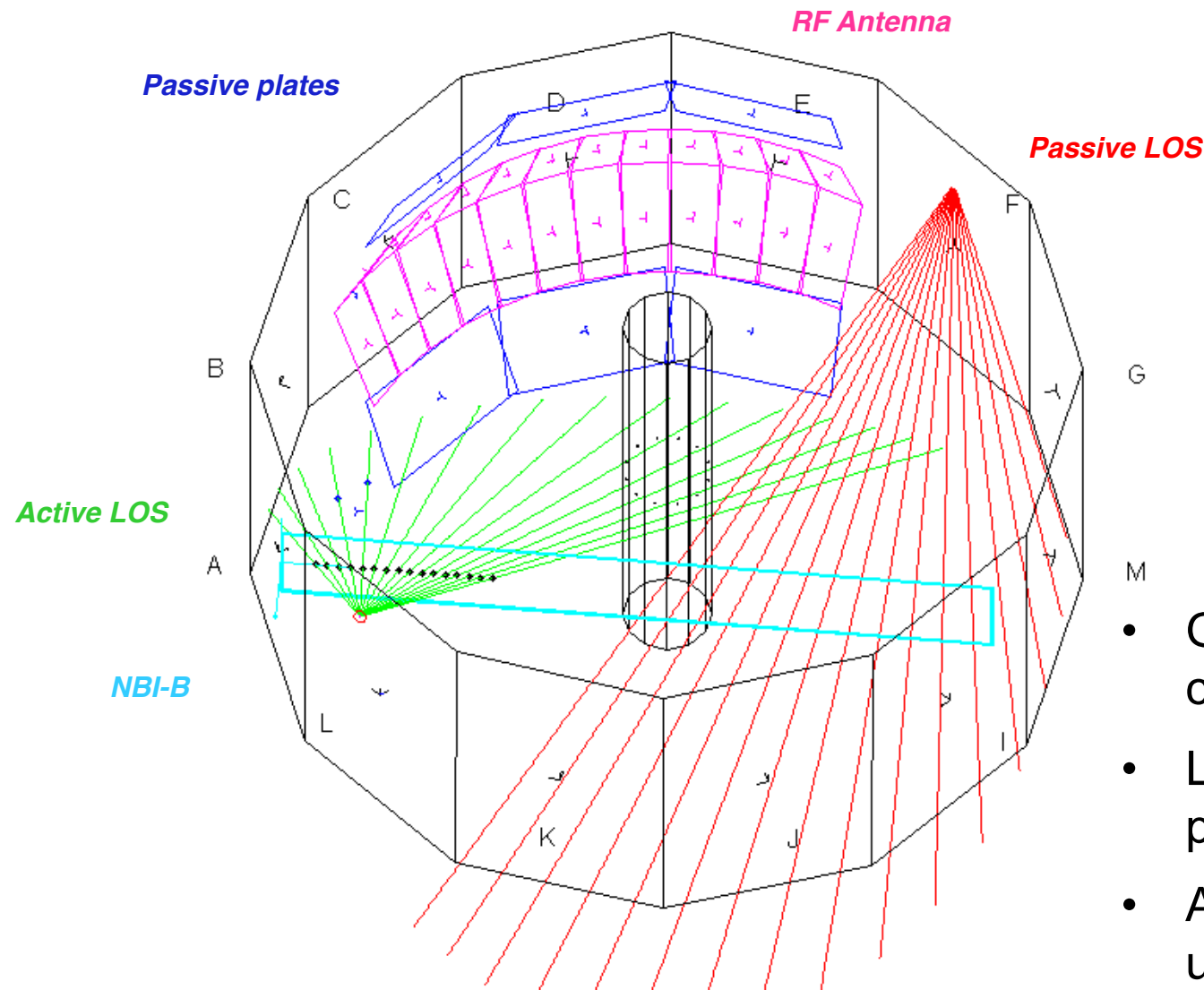
Tangential FIDA

- Present NSTX FIDA consists of two systems
 - s-FIDA, full Da spectrum, 16 channels $R=0.86-1.55$ m, 100 Hz
 - f-FIDA, energy integrated signal, 3 channels $R=1.0, 1.2, 1.4$ m 50 kHz
- Both system calibrated and operational for present NSTX run
- Views are vertical \Rightarrow Most signal comes from the perpendicular part of the Fast Ion distribution function
- New ***tangential FIDA*** is being designed to complement present system with observation parallel to B
- Collected signal with strong contribution from parallel part of Fast Ion distribution function (co current ions)
- ***spectroscopic + fast*** systems concept
- Preserved spatial resolution and coverage, optimized for faster time resolution

t-FIDA diagnostic views

- Active (on the NBI) and Background needed
- Need to drill two new ports in VV (diam~5-6 in)
- Guiding lines for selecting best location:
 - Maximize parallel component
 - Reduce beam emission pick-up
 - Avoid sources of background asymmetries (RF antenna, divertor plates)
 - Avoid NBI, NBI-u, DNBI halos on background view
 - Minimize modification of existing NSTX elements
- Candidate locations in Bay L/F (active/background)

Proposed Bay L/F views configuration

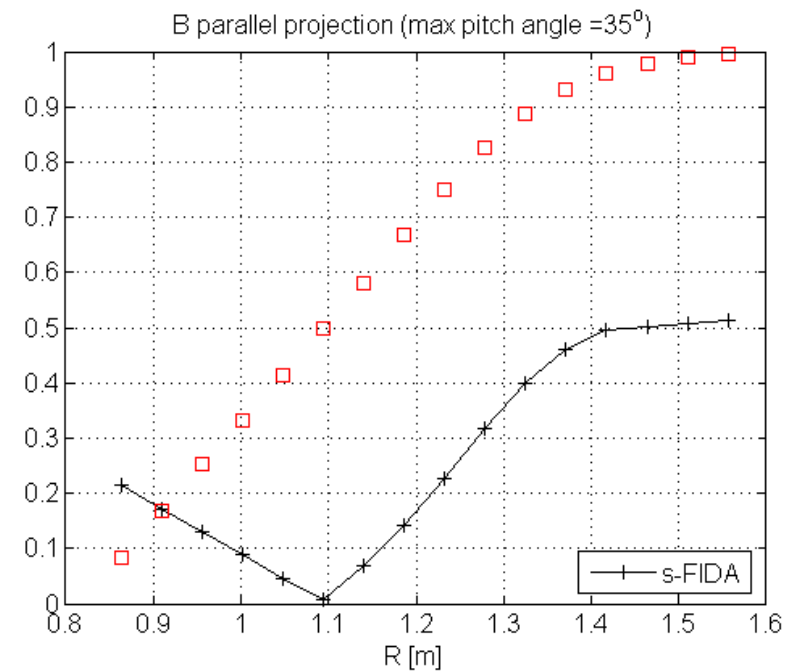
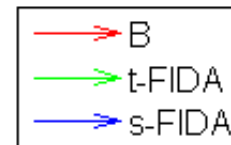
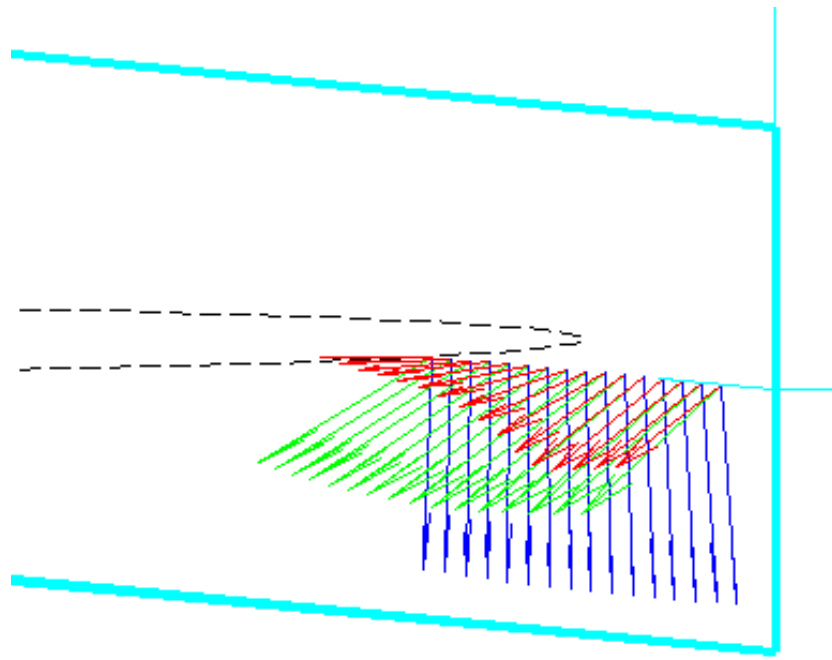


- Good parallel component up to R_{axis}
- LOS end up onto passive plates
- Accounting for NSTX upgrade

Tangential FIDA project status

- Candidate port locations has been identified: to be approved
- Vacuum Vessel stress simulations including new windows to be performed asap
- Main equipment elements identified (specifications similar to the existing ones), to be ordered by the end of May 2010
 - Lenses, f/1.7, 20 mm, view angle 57° (June)
 - Camera, PI back illuminated EMCCD 512x512, (July)
 - Band pass filters (July)
 - Spectrometer (Holospec) (Aug)
 - Fibers + Bundle heads + patch panel (Aug-Sept)
- Tangential FIDA systems expected to be calibrated and operational for FY2011 run

Parallel component



Bay L preliminary design

