

New experiments with NBI plasmas in TJ-II

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(on behalf of the TJ-II Team)

16-May-2012 proposal

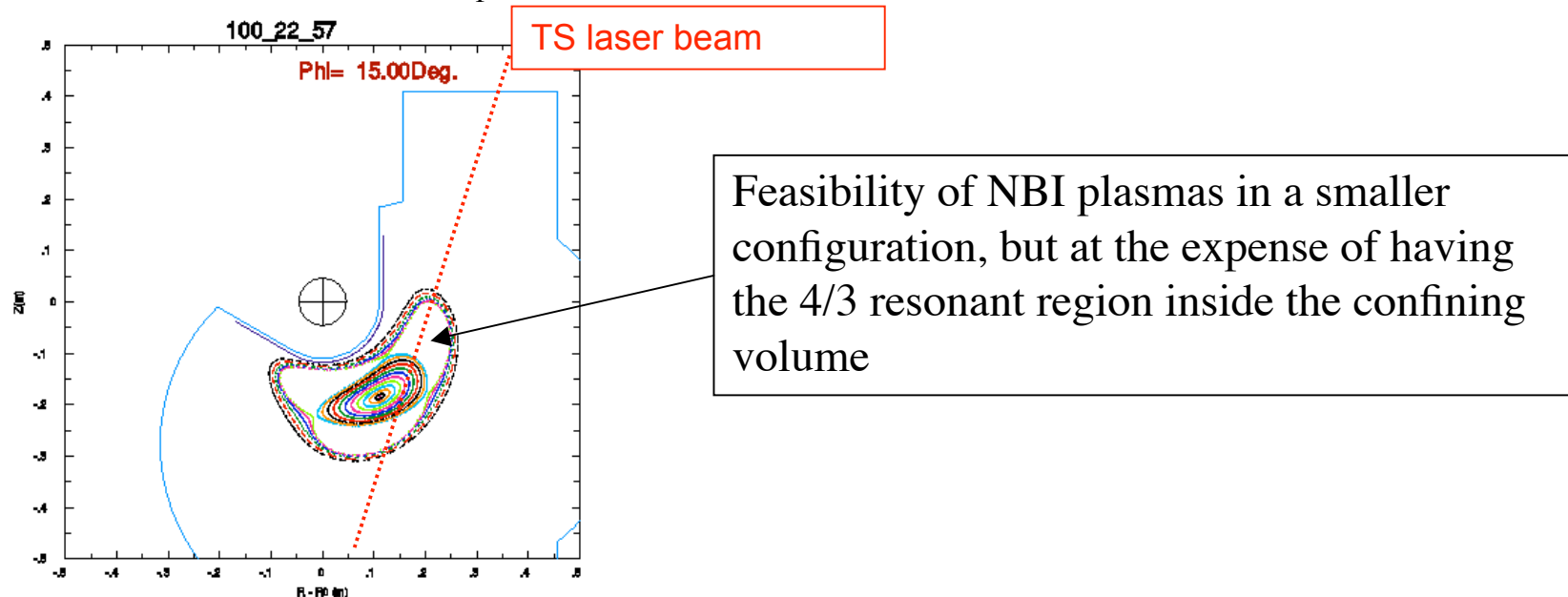
OBJECTIVE: High density Heliac plasmas with balanced NB injection, total power ≈ 1 MW (port through)

- volume scan (effective ripple)
- similarity with respect to the location of the main rational surface in each case:

100_40_63, $\iota = 8/5$ @ plasma edge; $\langle a \rangle = 0.177$ m

100_31_60, $\iota = 3/2$ @ plasma edge; $\langle a \rangle = 0.188$ m

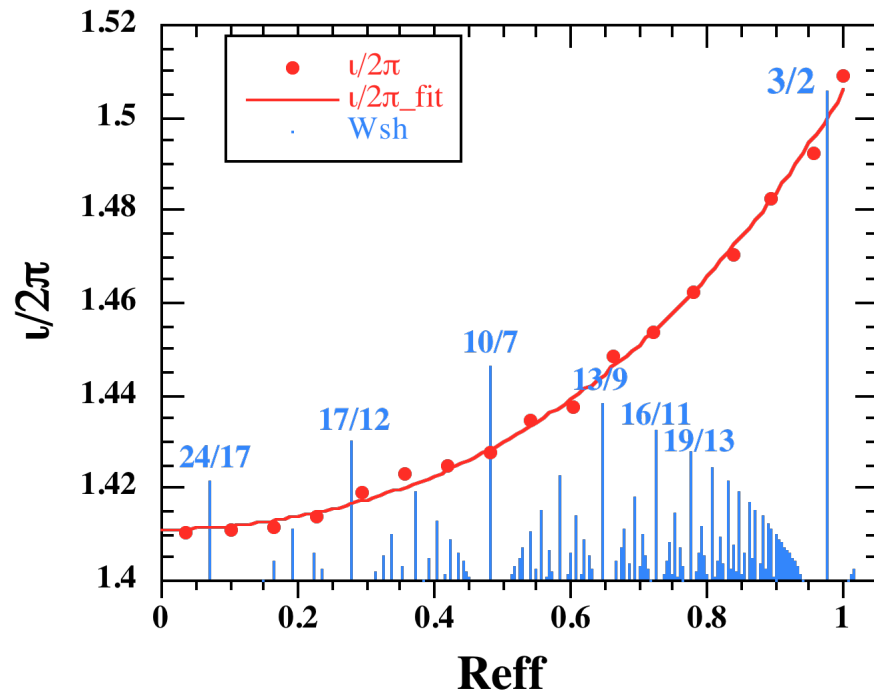
- properly diagnosed for comparison with NC calculations (i.e., plasma profiles including E_r or plasma potential profiles, sources, radiation...)



“Equivalent” configurations

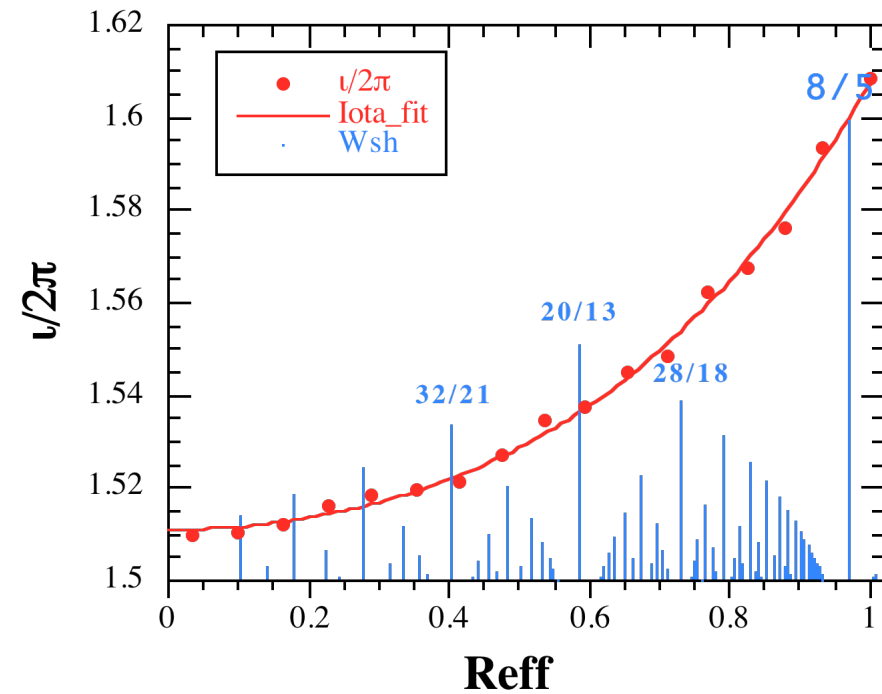
Vol. 0.88 m³

101_31_60



Vol. 1.04 m³

100_40_63

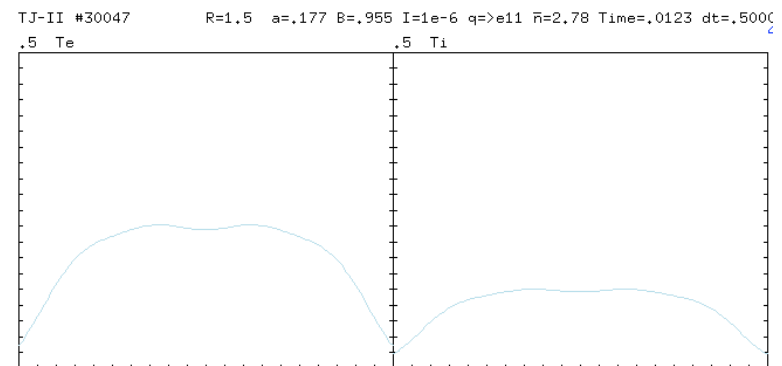
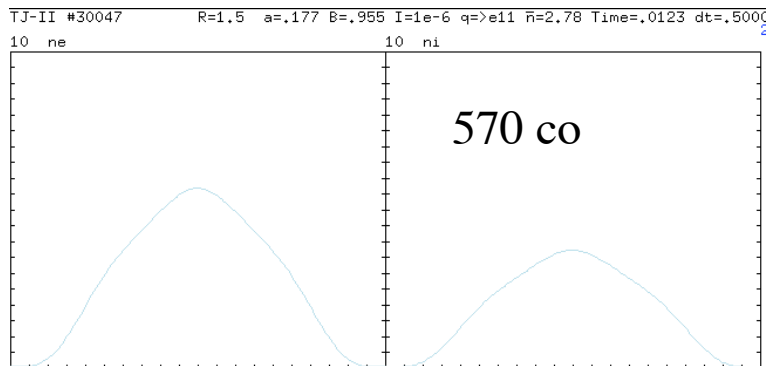
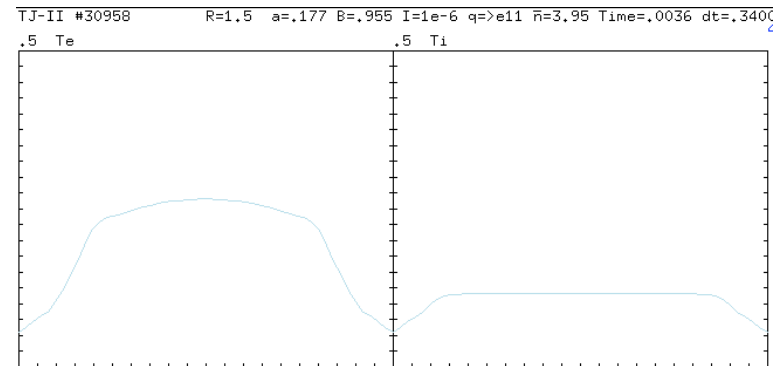
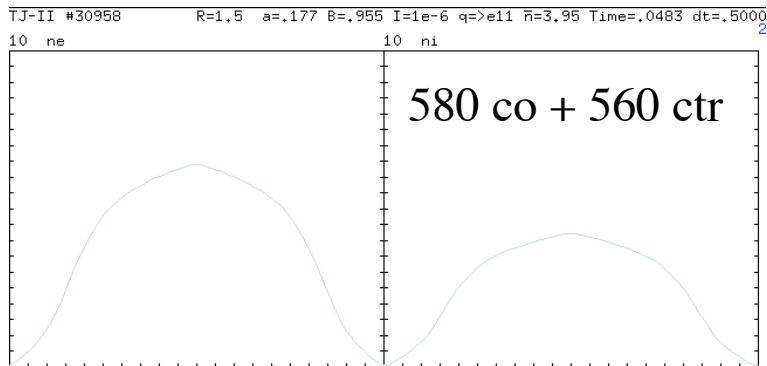
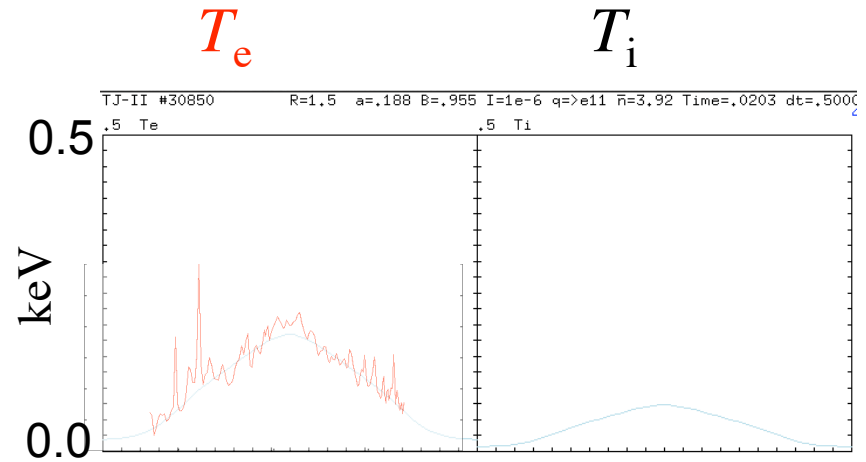
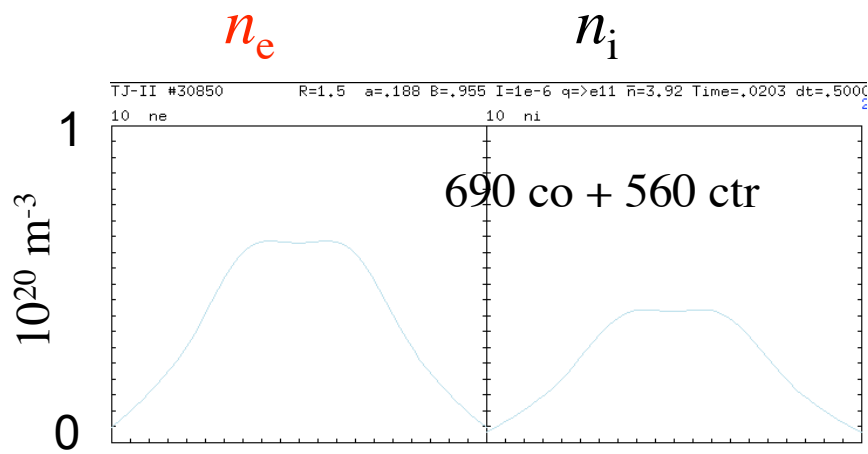


Major resonance ($3/2$ in conf. 101_31_60; $8/5$ in 100_40_63) located @ $\rho_{\text{eff}} > 0.95$ in vacuum.

Sample plasmas (still not optimum)

shot #	nlin (10^{19} m^{-3})	Ti0 (keV)	Te0 (keV)	iota_a	Wdia (kJ)	Pnbi-co (MW)	Pnbi-ctr (MW)	Vol (m^3)
30047	3.1	0.116	0.230	1.503	1.54	0.57	0	0.885
30850	4.4	0.075	0.210	1.605	–	0.69	0.56	1.040
30958	3.8	0.110	0.260	1.503	–	0.58	0.56	0.885
30050	5.8	0.096	–	1.503	3.20	0.57	0.52	0.885

Goal: obtain plasmas similar to #30050 under controlled conditions



100_40_63

100_31_65

Smoothed profiles, still to be checked against more diagnostics (e.g. Z_{eff} for ni-profiles)

Ongoing work

- Feasibility of (TJ-II) high density (approaching $n_e(0)=10^{20} \text{ m}^{-3}$) plasmas with $T_e \sim 0.25 \text{ keV}$, $T_i \sim 0.1 \text{ keV}$
- Availability of diagnostics for profile reconstruction and transport analysis
- Configurations available for NC and balance transport calculations
- Comparison with measured plasma potential (HIBP, CXRS, ...)
- Preliminary calculations (see José Luis' presentation, next)