LHCD in JT60_SA: a preliminary study

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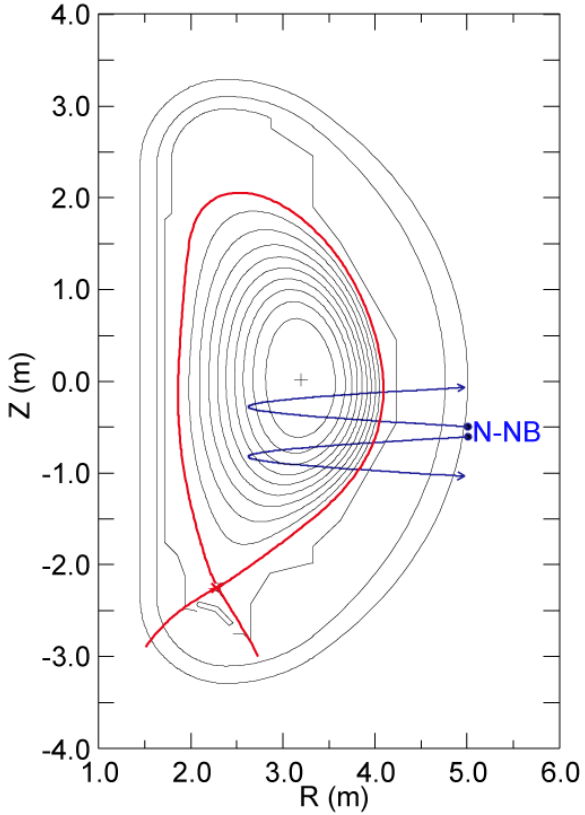
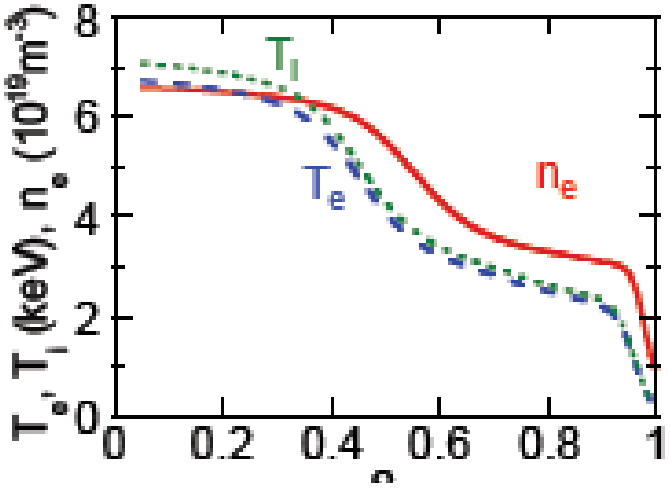
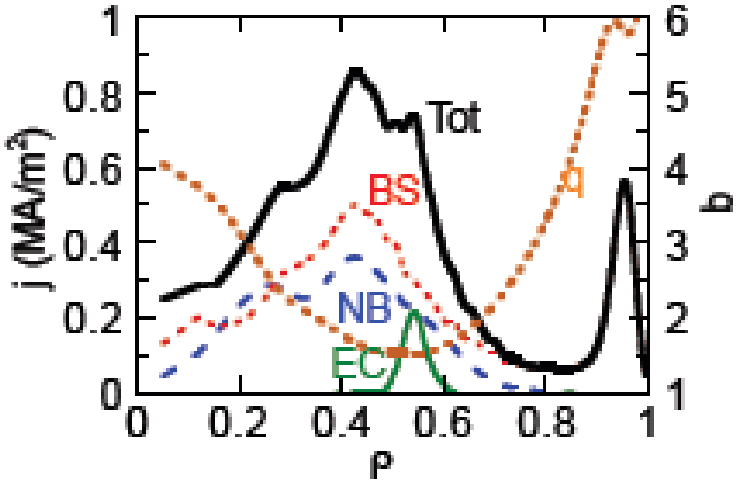
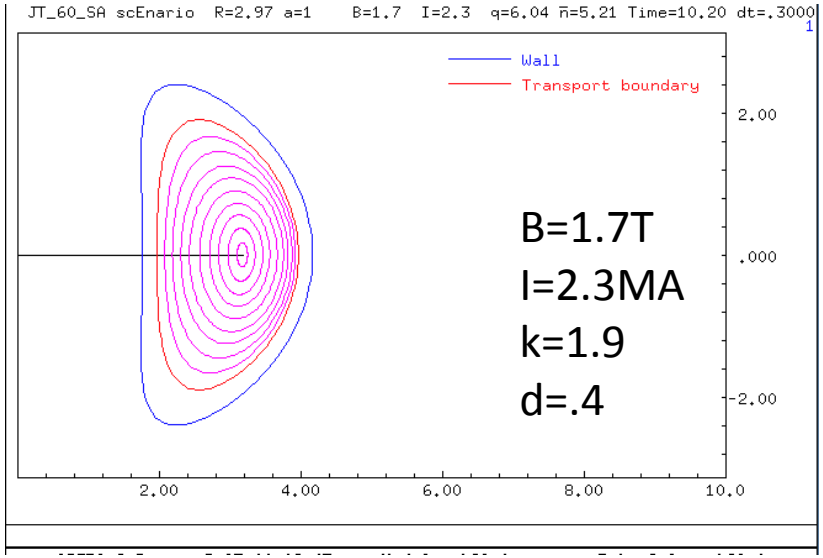
JT60_SA /High-β_N Full CD



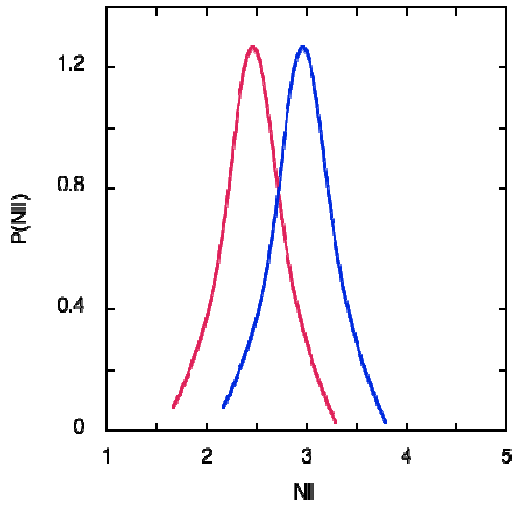




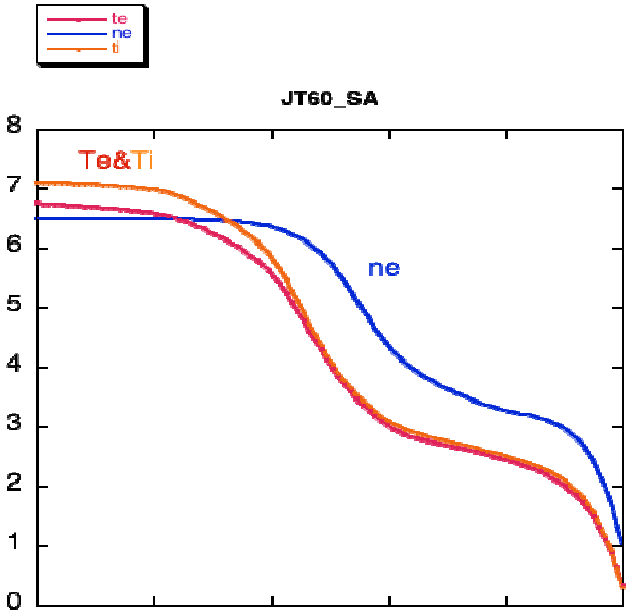
Simulation parameters

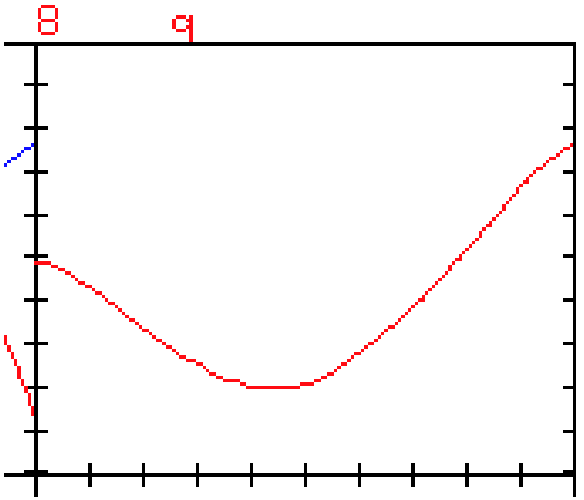


B=1.7T
I=2.3MA
k=1.9
d=.4



f=3.7Ghz
$n_{||}$ = 2.5-3
PL = 2MW

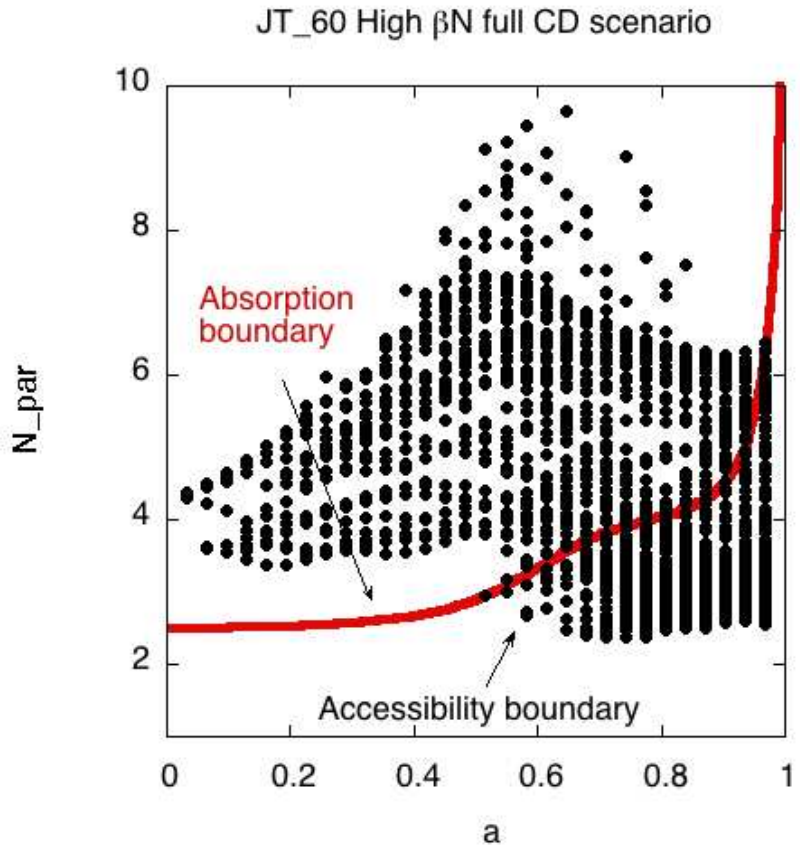




ACCESSIBILITY FOR THE HIGH BN SCENARIO

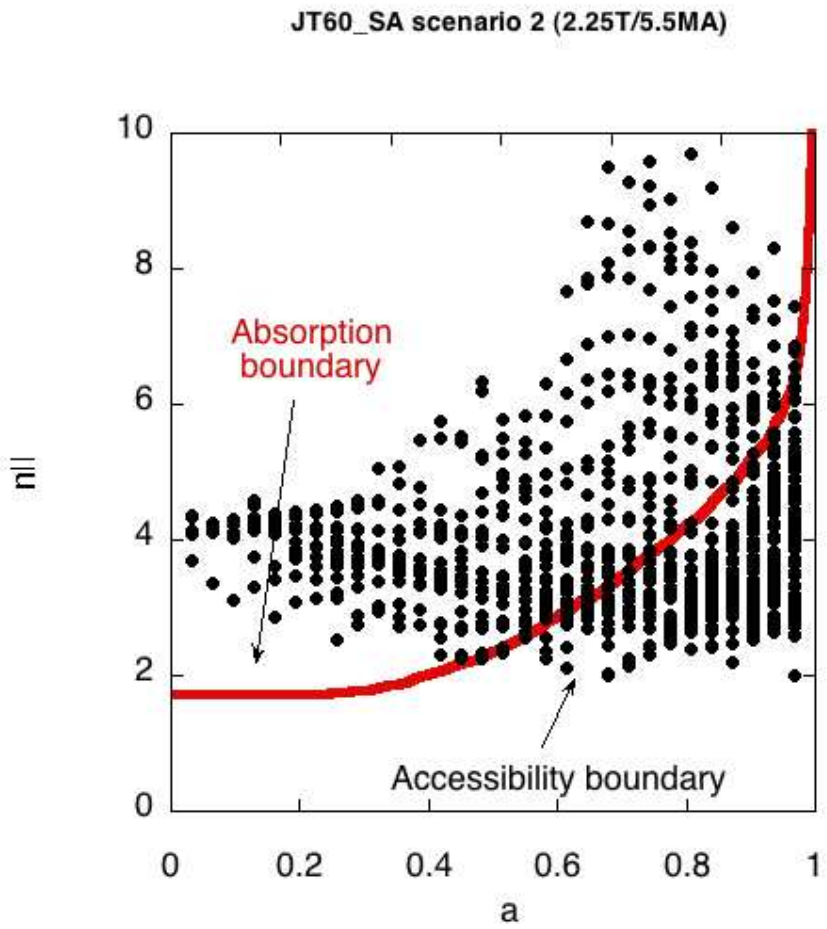
$n_{||}$ window between $n_{||ACC}$ (low boundary -non accessible region) and $n_{||ELD}$ (upper boundary- absorption region)

$n_{||ACC}$ ~ 2.5 in this scenario



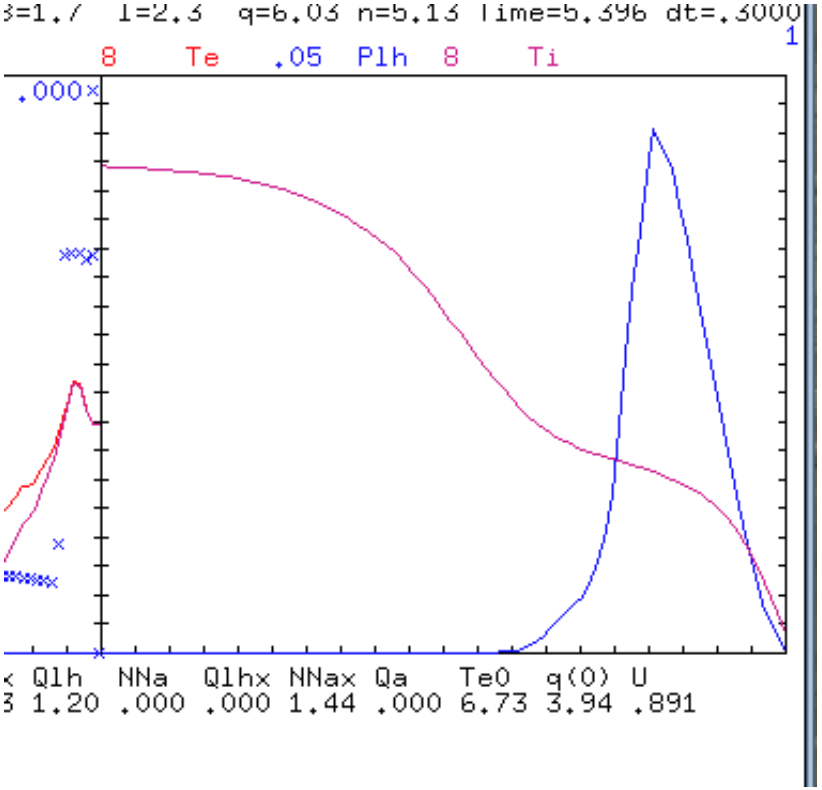
ACCESSIBILITY FOR THE SCENARIO 2 (SN, 5.5MA, 2.25 T)

$n_{||ACC}$ ~ 2.5 also in this scenario



High BN- full CD scenario
$n_{||Launch}$=2.5, P_{ABS}=1.2MW

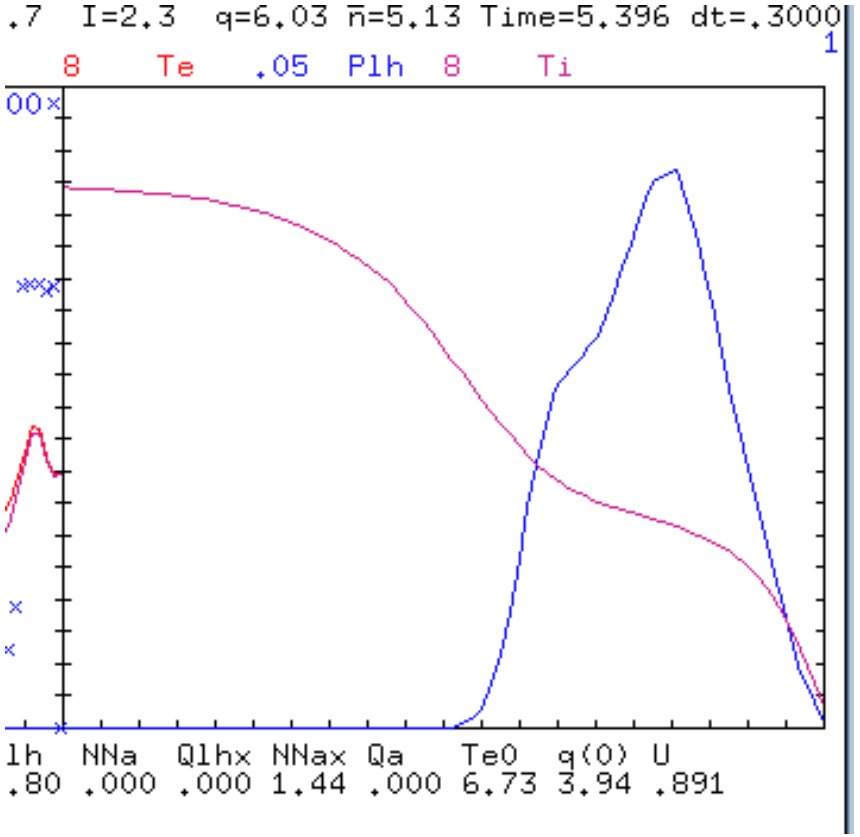
P_{LH-ABS}=1.2MW
I_{LH}=132KA



High BN- full CD scenario

$n_{||Launch}$=3, P_{ABS}=1.8MW

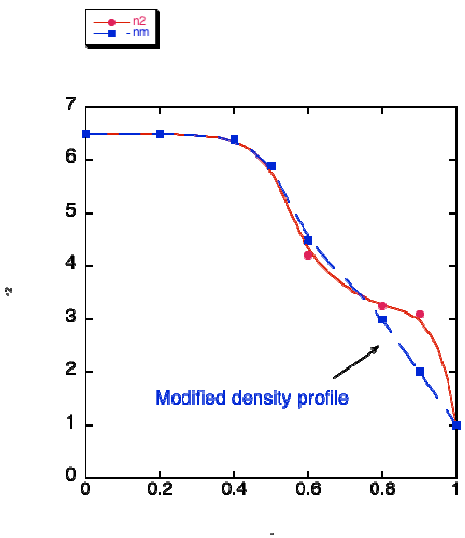
P_{LH-ABS}=1.8MW
I_{LH}= 219kA

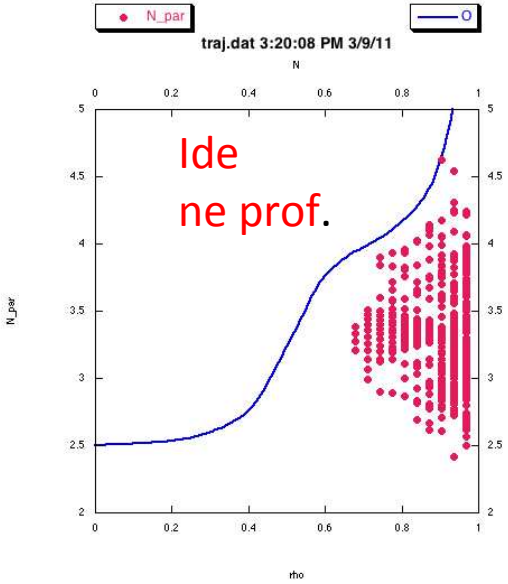


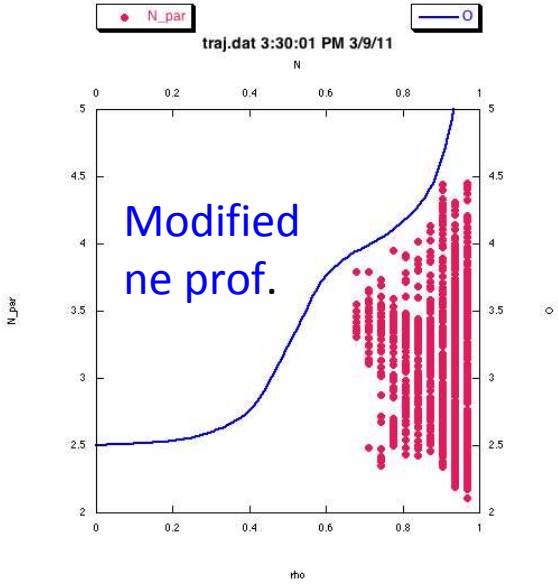
Fix $n_{||}$=2.5 and all the other parameters to nominal values and consider

- Density profile variations
- Temperature variation (T >> T/2)
- B_field (1.7 T >>>1.9 T) (P_{ABS}=1.2MW >>1.6MW)

Considered density profile variation

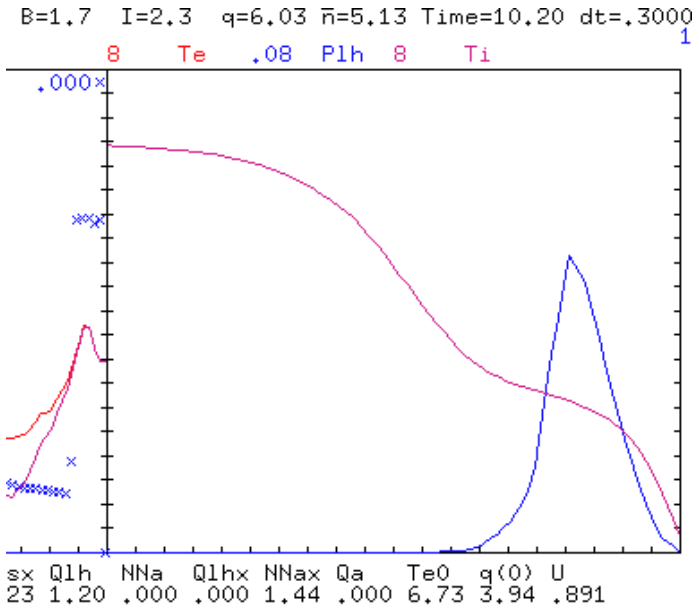


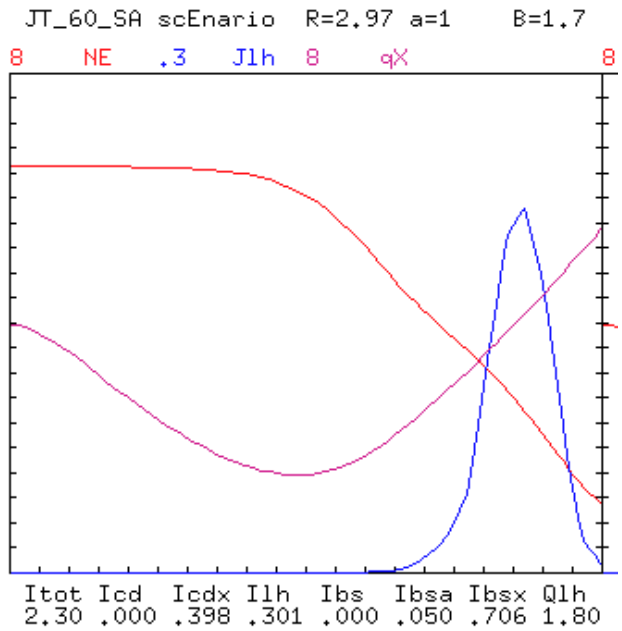




- Lower edge density
- Better accessibility

Absorbed power increases at lower edge density, while penetration is similar

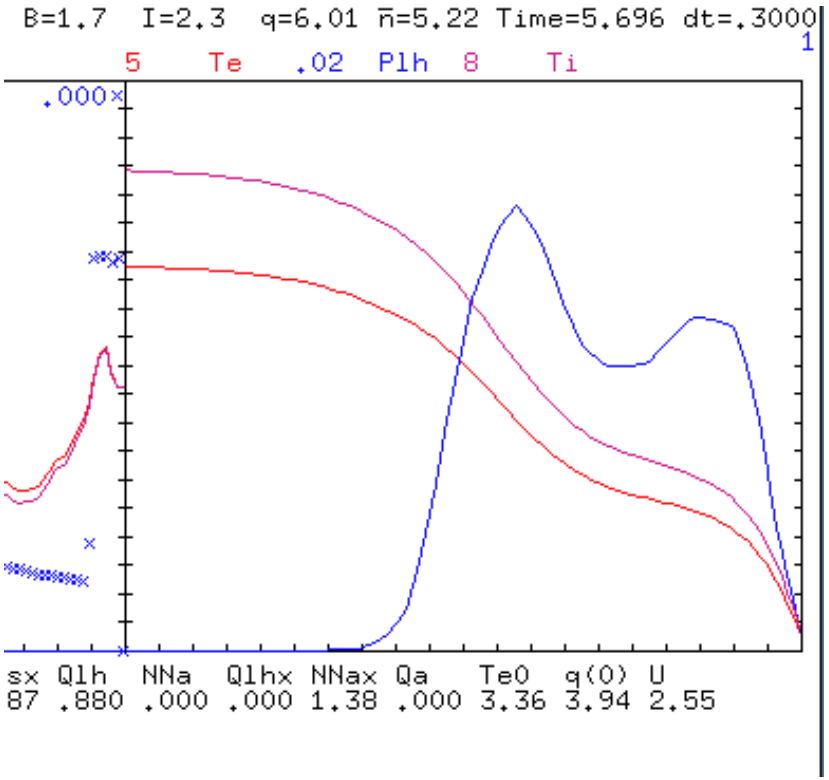




Ide n_e prof.
PLH=1.2MW

Mod.n_e prof.
PLH=1.8MW

Temperature dependence: less absorbed power but better penetration



$T=T_{IDE}/2$

P_{ABS}~0.9MW

Preliminary conclusions

- JT60_SA has low field and high density
  >> high launched $n_{||}$ ($n_{||}$=2.5-3)
- The accessibility condition sets $n_{||} \geq 2.5$
- In the high β_N scenario
  - PABS=60% at $n_{||}$=2.5
  - PABS=90% at $n_{||}$=3
- Launching $n_{||}$=2.5 the absorbed power ranges between 60% and 90% by varying edge density profile
- >>> CD localized at 0.8-0.9,
- Going to higher frequency does not improve the emerging picture.
- LHCD in the current ramp-up has to be studied