Update on the collaboration project for the analysis of JT60U and JET shots

J. Garcia, N. Hayashi

JT60U

• Standard H-mode : SN33654, SN33655
• Advanced Inductive : SN39713 (high performance High β_p H-mode), SN 48158 (Long pulse High β_p H-mode)
• Steady State with ITB : SN43046, SN45903 (RS, long pulse), SN48246 (higher β_N, lower q_{min})

JET

• Standard H-mode : #73344 (high triangularity at 0.8 Greenwald density), #74175 (low triangularity), #77070 (low triangularity) and #73342 (high triangularity at high density above the Greenwald limit)
• Advanced Inductive : #77922 (high triangularity), #77914 (low triangularity), #77280 (20s long pulse Hybrid, low triangularity)
• Steady State with ITB: #77895(high triangularity), #76063 (high β_N), # 53521 (low triangularity strong ITB)

# Scope of the project

Modeling of those plasmas

- Predictive and interpretative simulations of the JET and JT-60U plasma scenarios using both the EU and JA suites of codes.
- Apply plasma models on codes both developed at one side (JA/EU) for plasmas at the other side (EU/JA) to benchmark the codes and models.

JT60U data obtained

• Standard H-mode : SN33654, SN33655

• Advanced Inductive : SN39713 (high performance High β_p H-mode), SN 48158 (Long pulse High β_p H-mode)

• Steady State with ITB : SN43046, SN45903 (RS, long pulse), SN48246 (higher β_N, lower q_{min})

• In red, profiles obtained by using Adamtool, Febqu and Daisyx

• In black, no data yet

• Remote data connection already established and operational

• Exchange of information done by ascii files
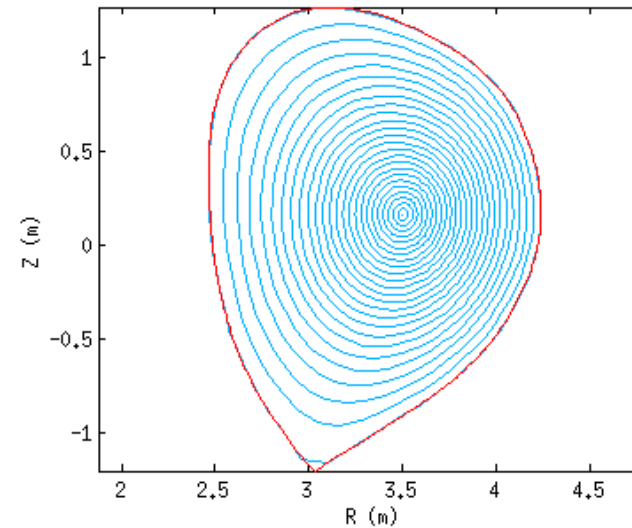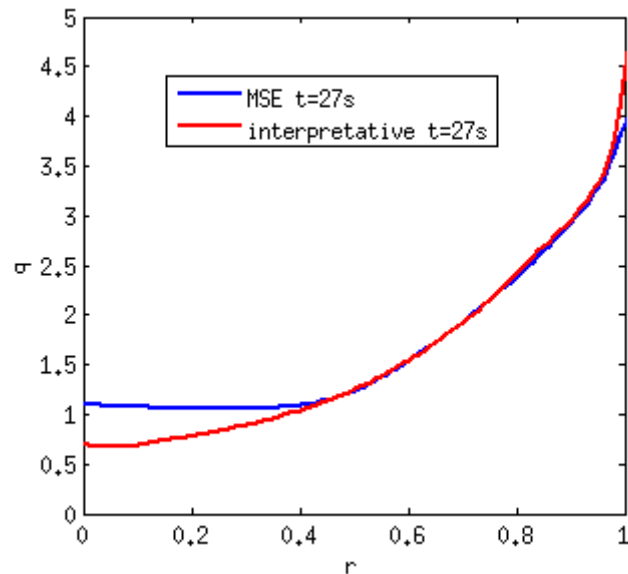
Shot 48158
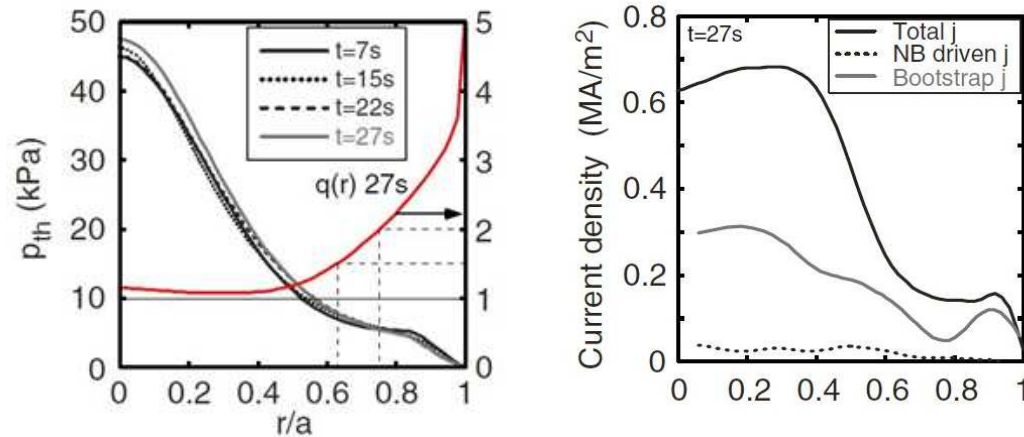
N. Oyama et al., Nucl. Fusion **49** (2009) 065026
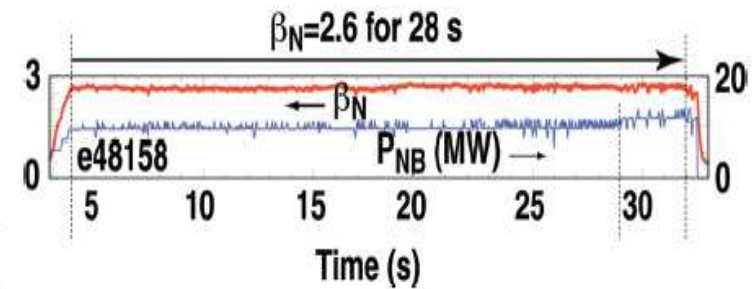
Luce T. et al., 23rd IAEA Fusion Energy Conference, 11-16 October 2010, Korea, ITR/1-5.

- Data from shot 48158 have been transfered to CRONOS
- A CRONOS file has been created
- A first interpretative simulation has been carried out
- NBI data used calculated by JT60U team
- NBI configuration already obtained, calculation of NBI power and curent drive with CRONOS to be done

- The intpertative analysis shows that the q profile is not well simulated
- q0 drops below 1
- The situation is similar to that obtained in AUG
- Preliminar results to be repeated: a very sharp X point leads to problems with equilibrium

Shot 48158 predictive simulation with Bohm GyroBohm model
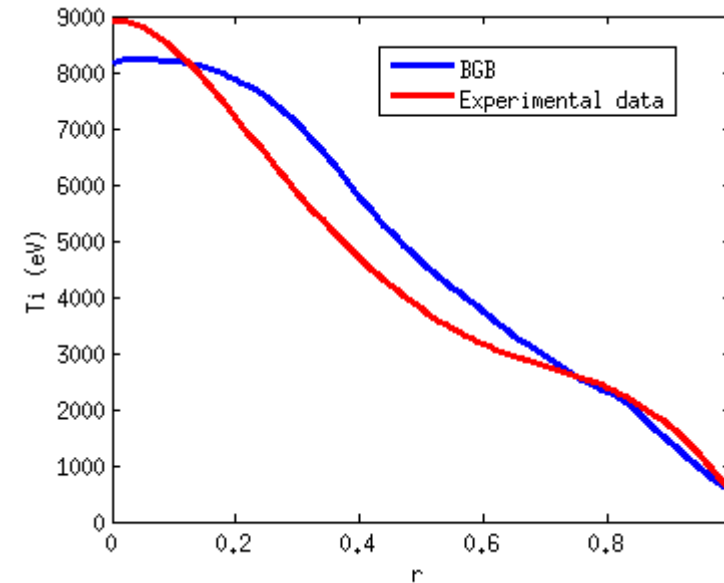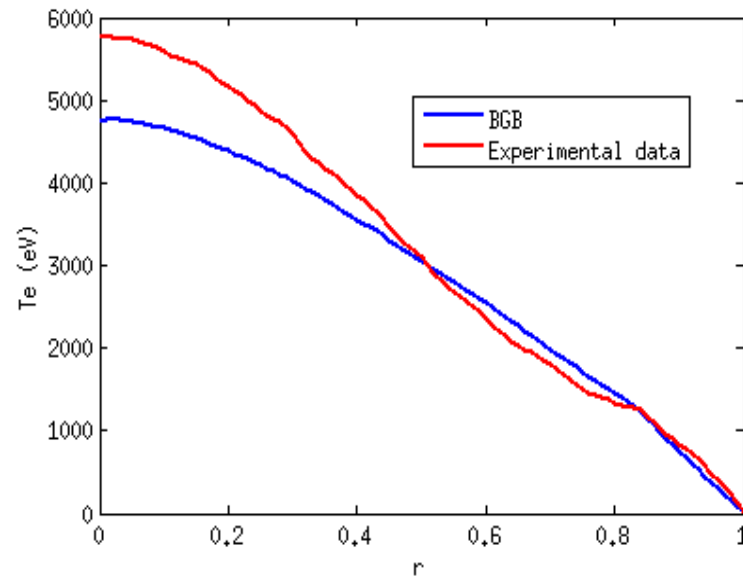
- Pedestal and rotation profile taken from experiment
- Electron and ion temperatures reasonably well simulated
- The level of agreement is similar to JET
- Transport barrier for the ions predicted at r<0.5 like in the experiment
- Results to be confirmed

Future work

- Transfer missing data from JT60U to CRONOS

- Transfer missing data from JET shots to Topics

- Implement CDBM transport model in CRONOS

- Benchmark NBI modules with both codes

- Perform interpretative and predictive simulations of the shots