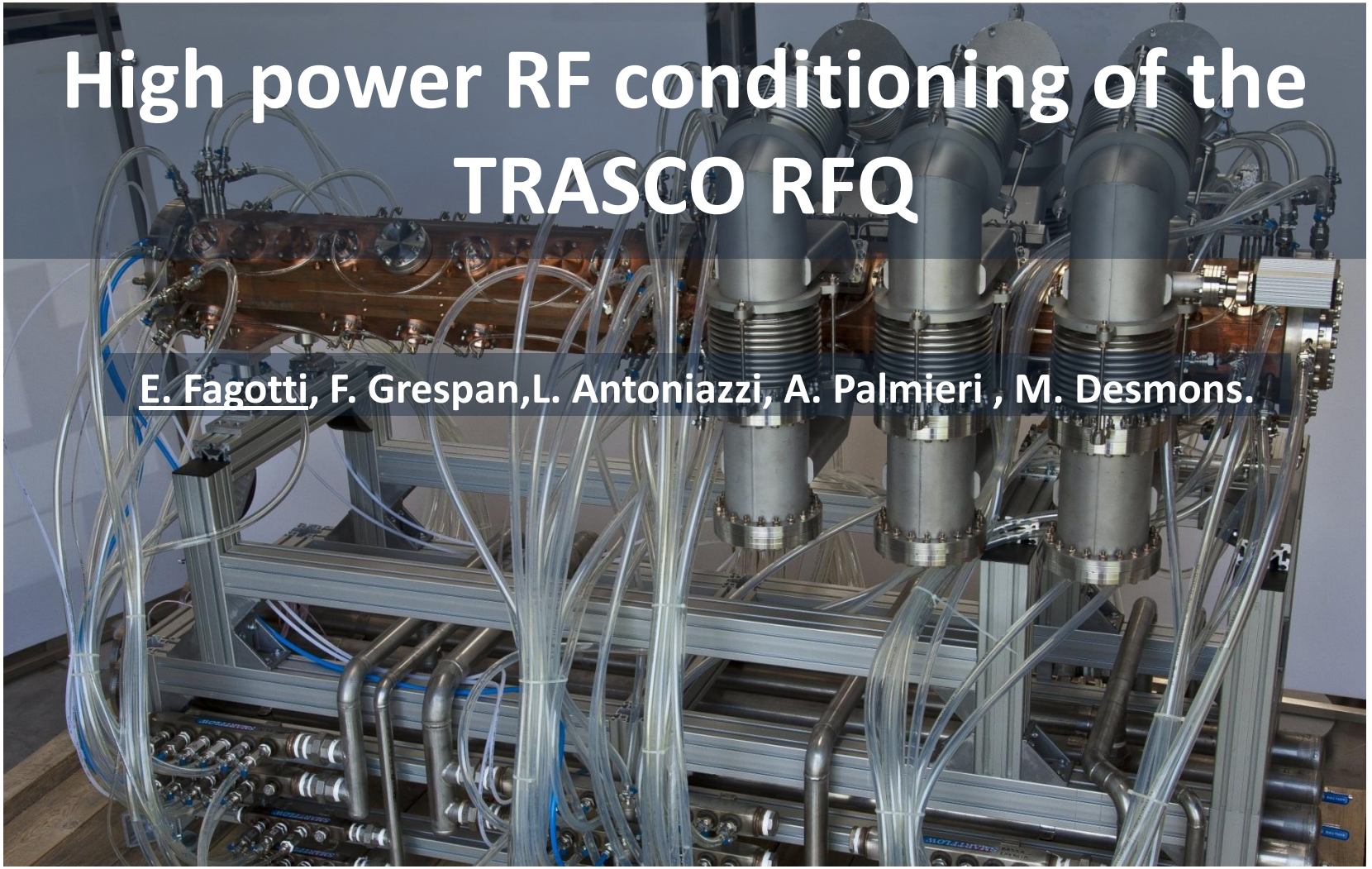
LINAC12
XXVI Linear Accelerator Conference
Tel Aviv, Israel, September 9-14, 2012

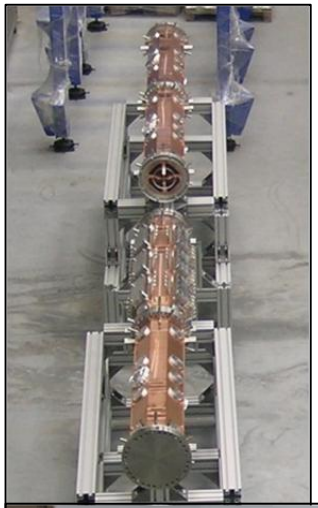
INFN
Istituto Nazionale
di Fisica Nucleare

High power RF conditioning of the TRASCO RFQ

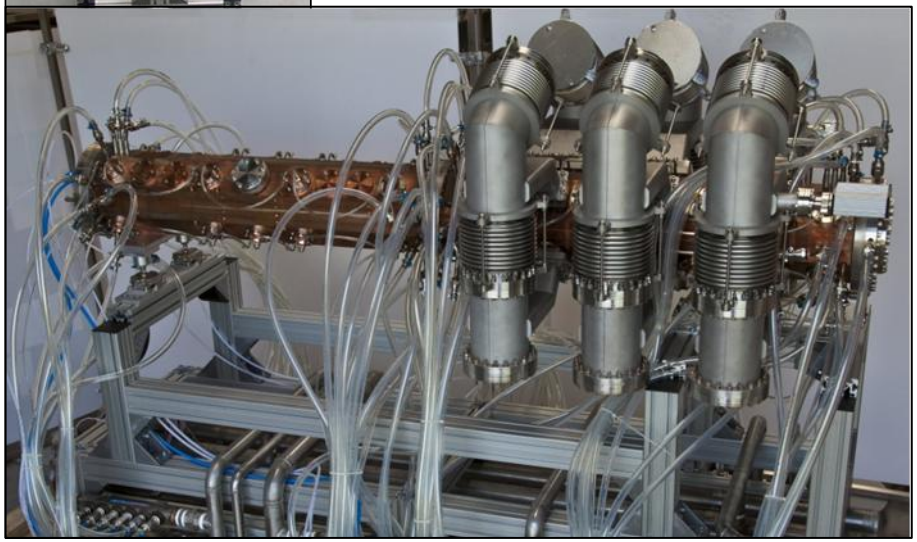


E. Fagotti, F. Grespan,L. Antoniazzi, A. Palmieri , M. Desmons.

Main Parameters



Main RFQ parameters	
Type	4-Vane
Structure	3 EM segments with 2 coupling cells
Frequency	352.2 MHz
Proton current	40 mA
Proton energy	5 MeV
Inter-vane Voltage	68 kV
Q_0 (SF 2D)	9900
RF Power dissipation 2D	500 kW



First segment parameters	
Frequency	352.2 MHz
Inter-vane Voltage	68 kV (1.8 Kilp.)
Q_0 Expected(SF/1.3)	7600
RF Power diss. (exp.)	215 kW
Freq. detuning (full power)	-132 kHz
Field flatness	±1%

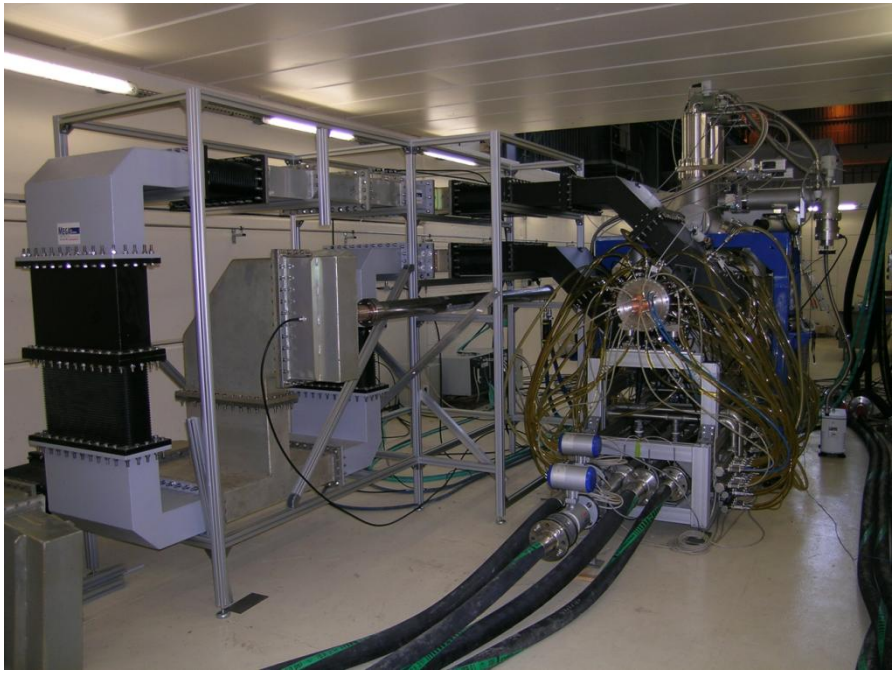
RF Test Stand at CEA

INFN
Istituto Nazionale
di Fisica Nucleare






Collaboration agreement between INFN and CEA for TRASCO high power test in CEA Saclay

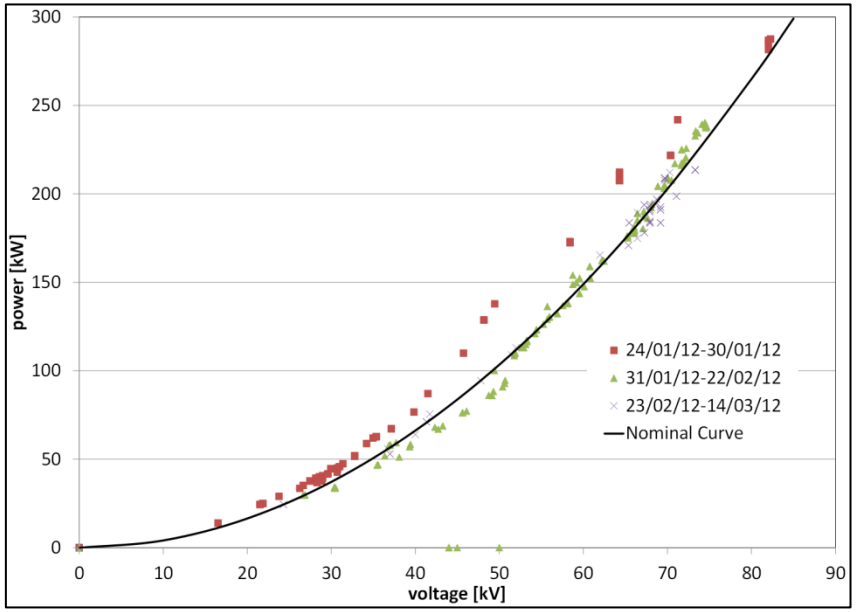


Results

INFN
Istituto Nazionale
di Fisica Nucleare

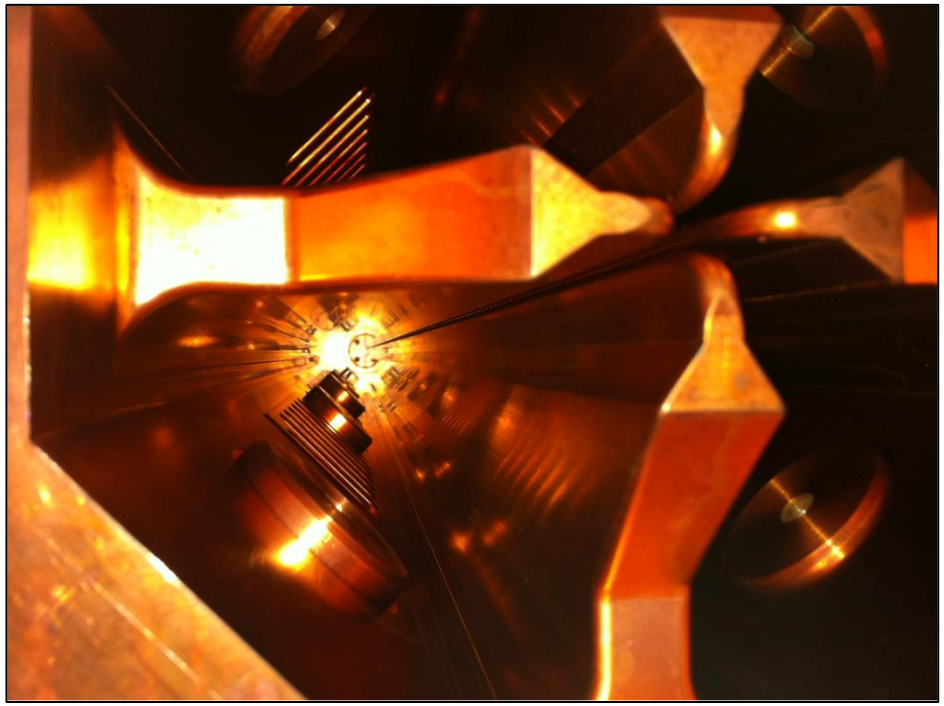
Measured Parameters		Comments
Inter-vane Voltage	68 kV CW (1.8 Kilp.)	82 kV (2.2 Kilp.) with 0.4 ms 1.1Hz time structure
Q_0	8460	no degradation with RF joint opening
RF Power diss.	192 kW	80 kW/m
Freq. detuning (full power)	-238 kHz	thermal elongation of the noses near end plates
Field flatnes	±2%	same reason

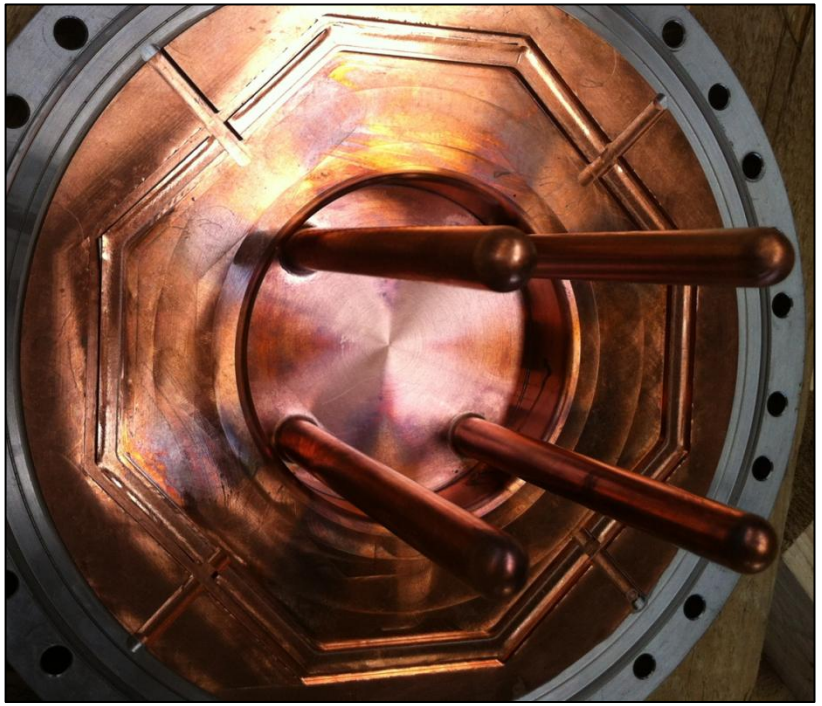
Peak cavity power, obtained as function of the cavity voltage.



Results

Inspection of internal surface and termination plates after high power test





Traces of discharge on vane tips high energy part (low field region) and on high energy termination plate

Conclusions

- Nominal voltage achieved in steady state CW operation.
- 120 % of the nominal voltage achieved in pulsed mode (0.1% DC).
- Power balance requires 900 kW for accelerating 40 mA proton beam up to 5 MeV with 10 % of margin on cavity voltage.
- Noses region has strong impact on frequency detuning and field flatness. Final tuning must take into account these effects.