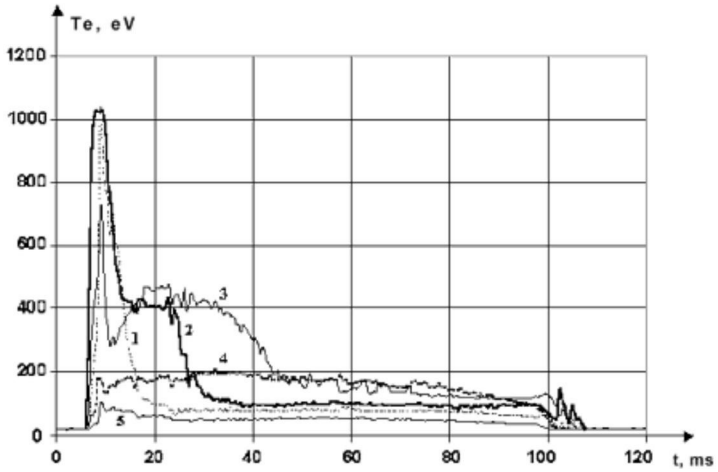
52-85GHz Heterodyne Sweeping ECE Radiometer launched on TCV BR Tokamak

At our March 2002 Newsletter we reported the shipment of unique 5 Heterodyne Sweeping ECE Radiometer for Physics Lab of Instituto de (San Paulo, Brazil). This equipment was shipped as the result of our cooperation with this Brazilian customer since 1998, when ELVA's Mu Interferometer was initially installed at the Tokamak site.

Fig.1. ELVA representatives Dr. Leonid Bogdanov and Mr. Alex Sergeev (in the centre) with Physics Lab staff at TCABR Tokamak site.

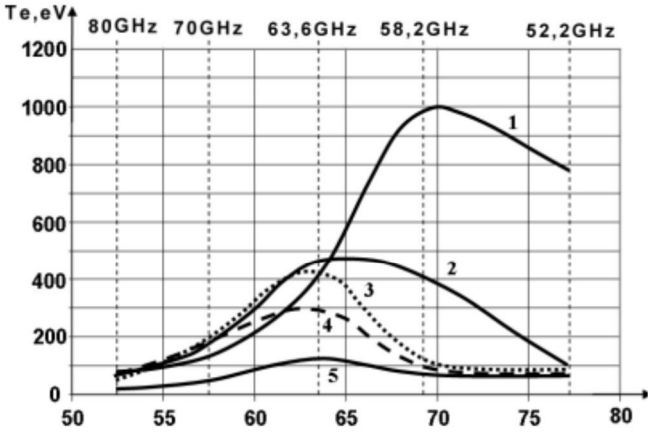
The plasma temperature measurement theory is based on a fact that the ECE (Electron Cyclotron Emission) is proportional to the electron temperature in situations when the plasma may be considered as the own cyclotron radiation. So the magnetized plasma electrons emit el energy at electron cyclotron frequencies with intensity proportional t temperature.

As there is toroidal magnetic field gradient in the tokamak plasma, e different points along the major radius of the torus radiate at differer the radial electron temperature distribution can be measured by scar frequency, received by the radiometer.



During summer 2002 time, our engineers visited customer sit radiometer tuning and a series of plasma experiments. These measurements at 52GHz to 75GHz on second harmonic of ele frequency. ELVA's ECE Radiometer was used to register an ev frequency content emission at a mode of plasma heating by A measured dependence of electron temperature vs time for va shown in Fig.2.

Fig.2. Electron temperature vs time, 1– 52,2 GHz, 2– 58,2 GHz, 3– 63,6 GHz 80,0 GHz.



plane. The measured dependence of electron temperature T_e vs torus radius R for various points of time is shown in Fig.3.

Fig.3. Electron temperature vs torus radius. For t0=6ms, t1– t0+4ms, 2– t0+14ms, 3– t0+24ms, 4 – t0+34ms, 5 – t0+94ms. Where t0 – time zero of discharge

The experimental diagrams confirm radiometer efficiency at real experiment condition of TCABR Tokamak. The principal distinctiv 85GHz Radiometer are highly sensitive receiver and wideband BWO sweep generator, plus low cost of the equipment.

"Your visit to our laboratory was important. We are operating the machine in various regimes and everything seems to me worki praised Prof. Dr.Ruy Pepe da Silva from Plasma Physics Laboratory.