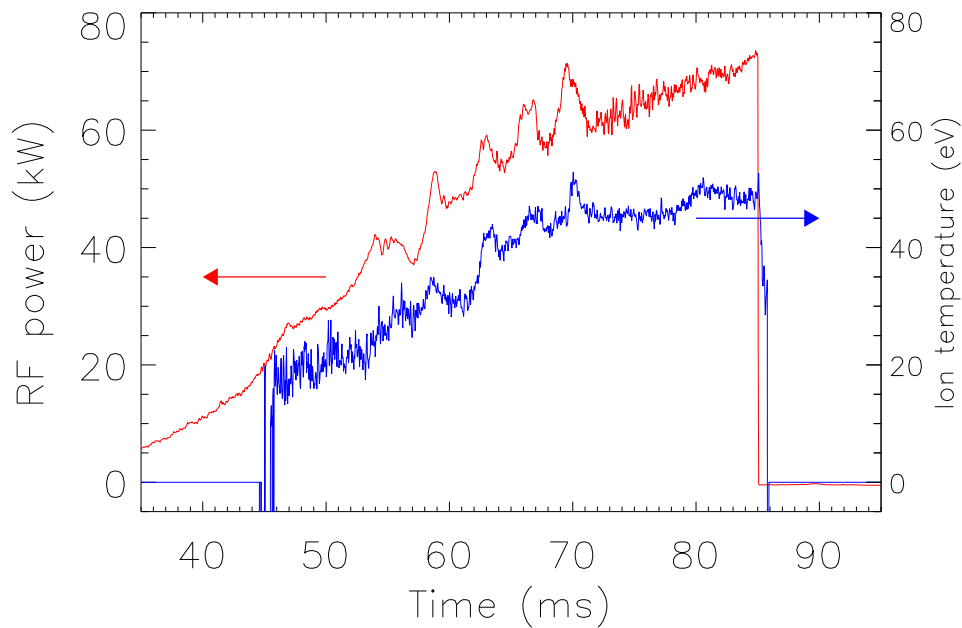
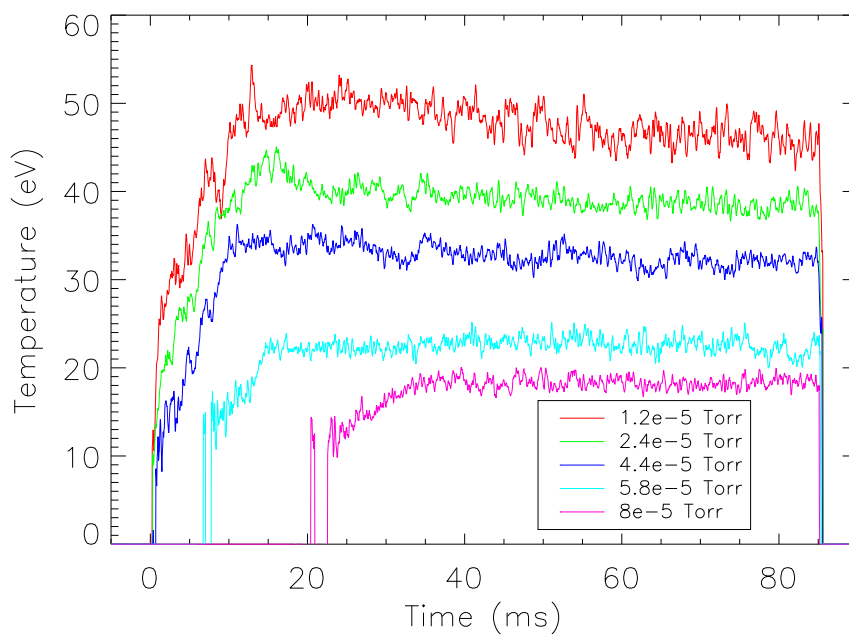


BASIC STUDIES

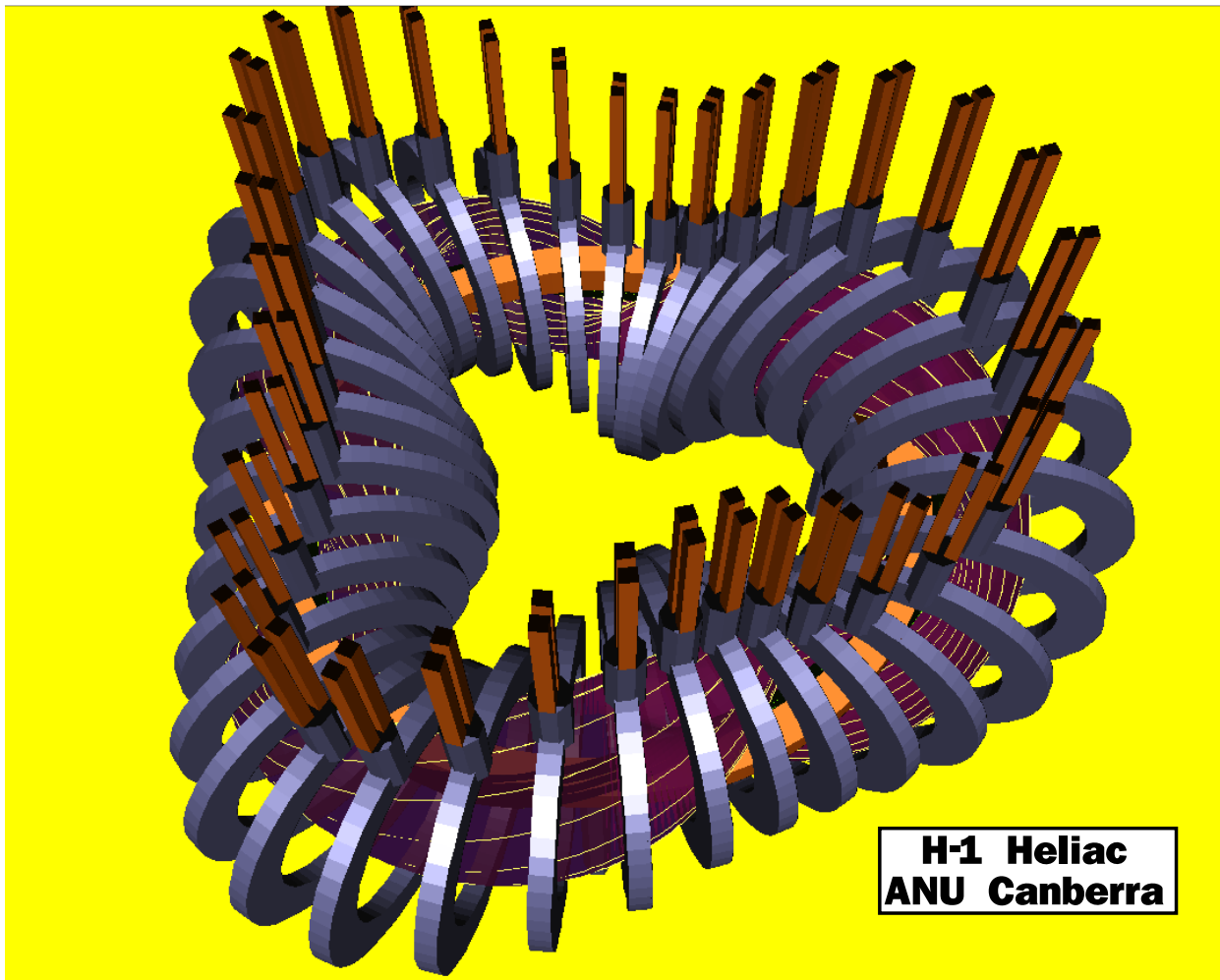


The absorbed rf heating power (red) and the measured argon ion (ArII at 488nm) temperature evolution (blue) during power ramp experiments



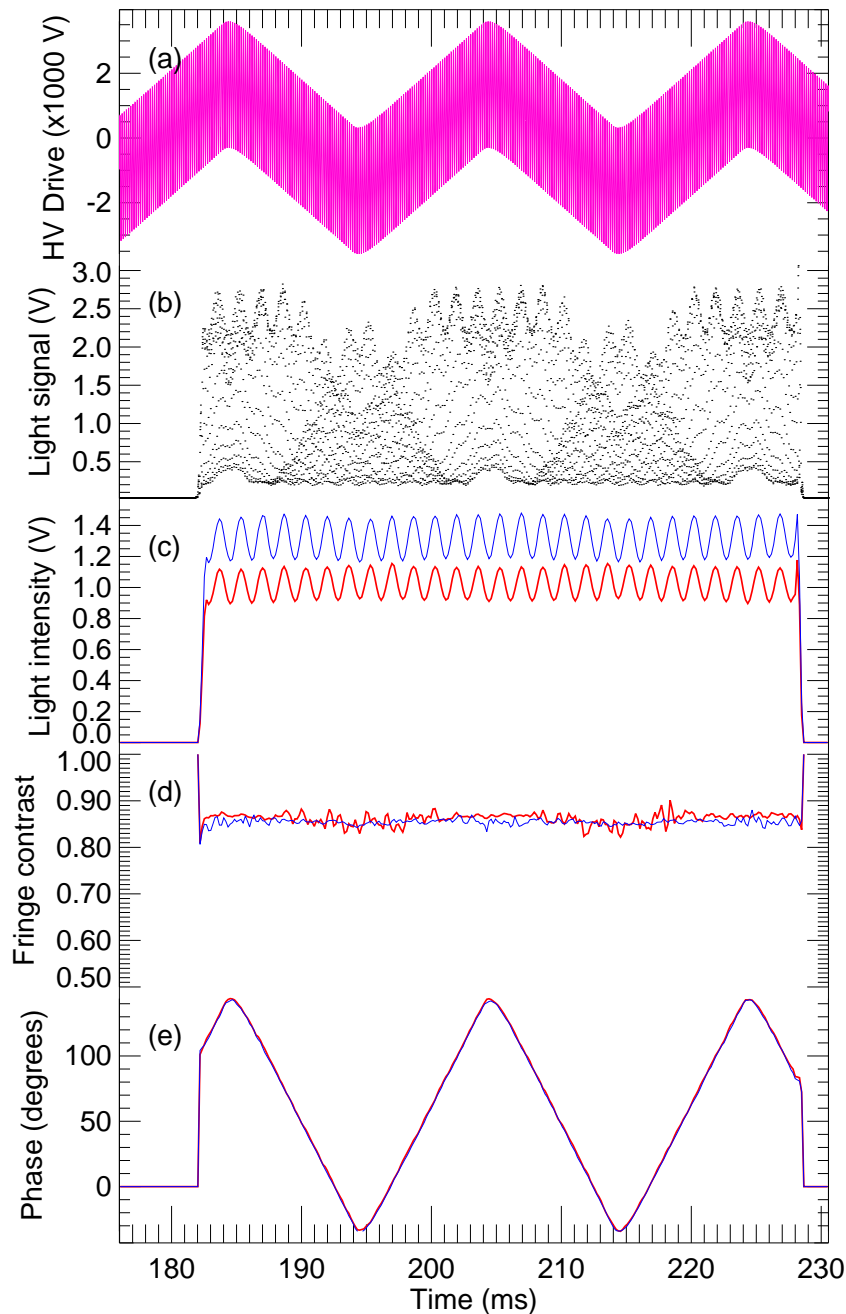
The ion temperature evolution for various static fill pressure showing expected dependence.

EXPERIMENTS ON H-1



- The H-1 heliac is a 3 period flexible helical axis stellarator
- $R=1\text{m}$, $a\sim 0.2\text{m}$, $B\sim 0.5\text{T}$, 250kW rf, 200kW ECH -July2000)
- Discharges in argon and helium 0.1-0.3T 80kW
- Unexpectedly high argon ion temperatures
- Spontaneous confinement transitions
- 488nm ArII, 468nm HeII

LASER MEASUREMENTS CONFIRM INSTRUMENT PERFORMANCE



6kHz drive with superimposed 50Hz triangle

Synchronously digitized (16f) interferogram

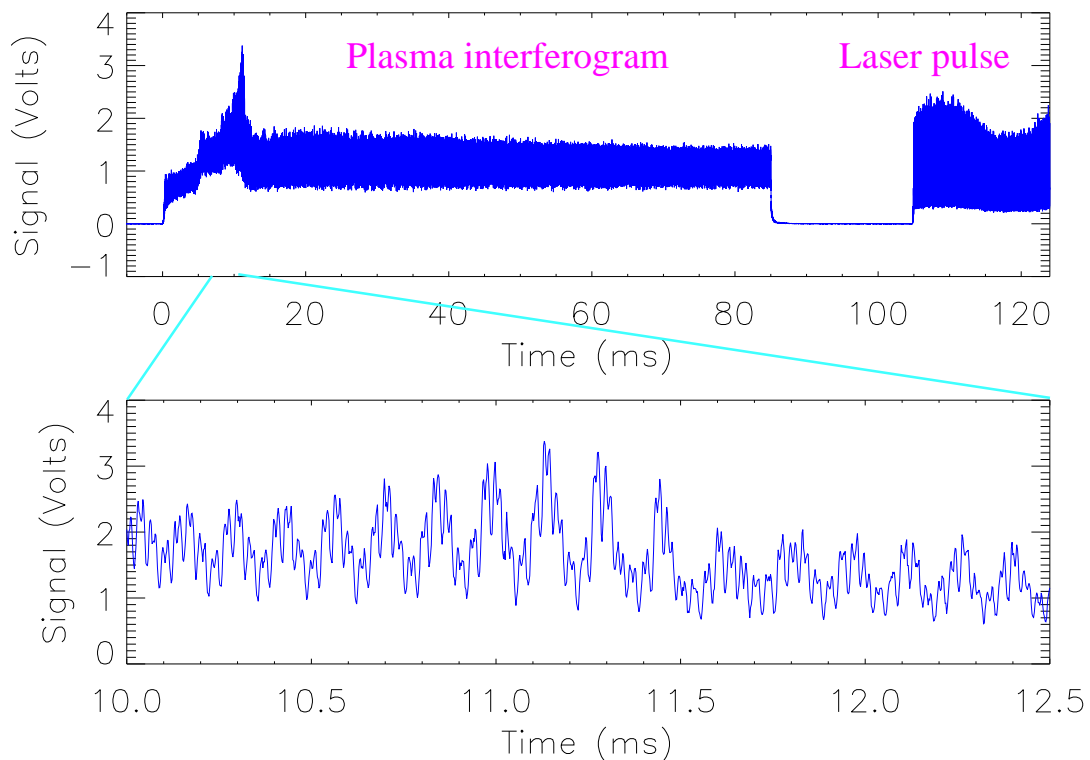
Light intensity for signals at **reflect** and **transmit** ports

Fringe contrast is immune to strong phase and intensity modulations.

The extracted triangle wave phase modulation

Calibration results obtained for intensity modulated (600Hz sinewave) laser at 632.8 nm.

MOSS IS AN INTERFEROMETER



$$I(t) = I_0 [1 + \zeta_I \zeta_{\text{plasma}} \cos(\phi_0 + \phi_m \sin(\Omega t))]$$

Measured signal (interferogram) → $I(t)$
 1st moment (phase => flow) → ϕ_0
 0th moment (intensity) → I_0
 2nd moment (contrast => Temperature) → $\zeta_I \zeta_{\text{plasma}}$
 Modulation → $\phi_m \sin(\Omega t)$

$$\zeta_I = \exp(-T_I/T_C) \quad \zeta_{\text{plasma}} = \exp(-T_S/T_C)$$

T_I is the instrument temperature

T_S is the emitting species temperature

T_C is the characteristic temperature set by the instrument delay.

It is proportional to $1/\phi_0^2$ where $\phi_0 = 2\pi\nu_0\tau$ and τ is delay.