**IShTAR: a helicon plasma source to characterize the interactions between ICRF and plasma**

**Configuration**

1. Main vessel
2. Big magnetic coils
3. ICRF antenna
4. Glass tube
5. Helicon antenna
6. Helicon coils

Linear magnetic device with representative plasma edge:
- \( B = 0.2 \) T
- Plasma generated by external RF source (3kW, 0.1 T)
- Density: \( 10^{17} \) m\(^{-3} \) Ar or \( 10^{16} \) m\(^{-3} \) He
- Gaussian shaped plasma 10 cm radius
- \( T_e = 5-10 \) eV

**ICRF system**

ICRF antenna powered by 1kW generator with automatic tuner.
- Simple test strap
- Optimized antenna with limiters and plasma-shaped strap.

**Diagnostics:**
- Langmuir probes (on array and movable manipulator), video cameras, high resolution spectrometer

**Measurement of sheath electric field**

E-field measurement in plasma and sheath challenging: different components (RF, DC), high noise from the plasma (effect of static field, thermal radiation). Preliminary tests on dedicated electrode. Step by step approach to reconstruct field from Stark effect.

**Modelling of ICRF fields**

**Calculation of resulting Stark effect**

**Reconstruction of sheath electric field from measured spectrum**