

# INVESTIGATION OF INITIAL PLASMA PARAMETERS ON THE WENDELSTEIN 7-X STELLARATOR USING THE X-RAY IMAGING CRYSTAL SPECTROMETER

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XICS has been an invaluable diagnostic and has played an important role in understanding plasma performance during the first W7-X campaign.

- Provided the only measurement of the **ion temperature** ( $T_i$ ).  
Necessary for understanding the **global confinement time: 100-150 ms**.  
Allowed measurement of plasma performance:  
Highest **ion temperature** of **2.2 keV** with  $P_{\text{ECRH}} = 4.3\text{MW}$ ,  $T_e = 6\text{ keV}$ ,  $n_{e0} = 4 \times 10^{19}\text{m}^{-3}$
- Allowed the radial electric field ( $E_r$ ) to be measured.  
**Positive  $E_r$  seen in the plasma core** (electron-root).  
Good agreement with neoclassical calculations.
- Instrumental in studies of impurity transport and confinement.
- Provided a complementary measurement of the electron temperature ( $T_e$ ) profile.  
Could be compared with ECE and Thomson scattering diagnostics.  
Provided early confidence in the accuracy of  $T_e$  measurements.