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Direct Measurement of the Electron Bernstein Wave Absorption and Current Drive at the WEGA Stellarator. HEINRICH LAQUA, STEFAN MARSEN, MATTHIAS OTTE, YURIY PODOBA, Max-Planck-Institut fuer Plasmaphysik Euratom Association, JOSEF PREINHAELTER, JAKUB URBAN, Institute of Plasma Physics Association Euratom/IPP.CR — At the WEGA, which is a classical five period l=2 stellarator with a major radius of 0.72m and an aspect ratio of 6, electron Bernstein wave (EBW) heating by OXB-mode conversion was established for a frequency of 2.45GHz. Typical electron densities of $10^{18}m^{-3}$, which is 12 times the cut-off density, with an electron temperature of $\leq$ 20eV were achieved for 30s operation with an ECRH power of up to 26kW. The low temperature plasma allows the investigation both, the EBW power deposition and current drive profiles by probes. The first was performed by high frequency (12kHz) power modulation and coherent detection of the generated heat waves with Langmuir probes. The second was measured with a $\dot{B}$-loop. The total EBW current was of up to 45A and the related normalised current drive efficiency ζ was 0.48. The EBW propagation is strongly sensitive on the magnetic configuration. Both, the variation of ∇B along B and the shear can be changed individually, which makes WEGA an unique test bed for EBW propagation. As a result of the shear variation an EBW current reversal was found. The results were modelled by 3D ray-tracing calculations for the different magnetic configurations.

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