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**Measurements of Plasma Power Losses in the C-2 Field-Reversed Configuration Experiment** SERGEY KOREPANOV, ARTEM SMIRNOV, EUSEBIO GARATE, Tri Alpha Energy, ALEXANDR DONIN, ALEXEY KONDAKOV, SHAVKAT SINGATULIN, Budker Institute of Nuclear Physics — A high-confinement operating regime [1] with plasma lifetimes significantly exceeding past empirical scaling laws was recently obtained by combining plasma gun edge biasing and tangential Neutral Beam Injection in the C-2 field-reversed configuration (FRC) experiment [2, 3]. To analyze the power balance in C-2, two new diagnostic instruments – the pyroelectric (PE) and infrared (IR) bolometers – were developed. The PE bolometer, designed to operate in the incident power density range from 0.1 - 100 W/cm<sup>2</sup>, is used to measure the radial power loss, which is dominated by charge-exchange neutrals and radiation. The IR bolometer, which measures power irradiated onto a thin metal foil inserted in the plasma, is designed for the power density range from 0.5 - 5 kW/cm<sup>2</sup>. The IR bolometer is used to measure the axial power loss from the plasma near the end divertors. The maximum measurable pulse duration of  $\sim 10$  ms is limited by the heat capacitance of the IR detector. Both detectors have time resolution of about 10 – 100  $\mu$ s and were calibrated in absolute units using a high power neutral beam. We present the results of first direct measurements of axial and radial plasma power losses in C-2.

- [1] M. Tuszewski et al., Phys. Rev. Lett. 108, 255008 (2012).
- [2] M. Binderbauer et al., Phys. Rev. Lett. 105, 045003 (2010).
- [3] H.Y. Guo et al., Phys. Plasmas 18, 056110 (2011).

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