"X-RAY PIT" PARADOX AS AN INDICATOR OF THE LONGITUDINAL ELECTRON TRANSPORT IN TOKAMAKS [[1]](#footnote-1)\*)

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An apparently inexplicable phenomenon observed in laboratory tokamaks is analyzed - an active decrease in the intensity of the soft x-ray radiation (SXR) of tokamak plasma passing through the Be foils as their thickness increases and the electron density of the plasma decreases ("x-ray pit", figure left). An explanation of this phenomenon is proposed by involving the assumption of the "depletion" of the Maxwell distribution in space of electronic velocities exceeding 3-5 times the thermal one. The anomalous transfer of electron heat along a weakly perturbed toroidal magnetic field (the "magnetic flutter" model [1,2]), postulated for tokamak, could be a probable cause of this "impoverishment". Thus, the "x-ray pit" would be a new tool for studying the physical nature of anomalous electron transport in tokamaks. Other possible manifestations of longitudinal electron transport in tokamaks and stellarators are discussed, in particular, a drop in plasma lifetime and degradation of the plasma electrical potential during ECR heating [3,4].

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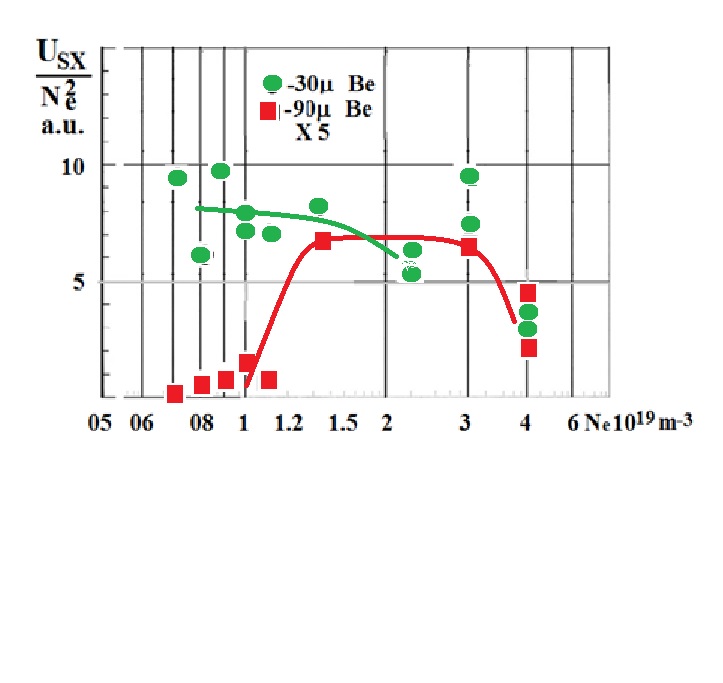


Figure - Evolution of soft x-ray radiation (1-6kev), passed Be – 30 mk (circles) and 90 mk (squares, multiplied by 5 times ) via the electron density of tokamak T-11M plasma, "x-ray pit" is left.

References

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1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/XLVII/R/ru/LE-Mirnov.docx) [↑](#footnote-ref-1)