Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Asymptotic quasioptical theory of mode-converting wave beams ILYA DODIN, PPPL, KOTA YANAGIHARA, Nagoya University, YAO ZHOU, PPPL, SHIN KUBO, NIFS — A general quasioptical theory of short-wavelength RF beams is proposed (arXiv:1901.00268). We use the Weyl calculus to develop a rigorous asymptotic approximation of the governing dispersion operator $\hat{D}$ and its projection on modes of interest. A parabolic differential equation (quasioptical equation) is derived for the wave envelope in curved coordinates constructed around some reference ray which propagates close to the beam center. The theory does not assume any specific $\hat{D}$ and, unlike other quasioptical models, can capture mode conversion. Single-mode and mode-converting beams are described on the same footing. Based on this theory, a new quasioptical code PARADE (PAraxial RAy DEscription) has been developed and tested (arXiv:1903.01357, arXiv:1903.01364), as reported in a separate poster by K. Yanagihara *et al.*.

Ilya Dodin
Princeton Plasma Physics Laboratory

Date submitted: 03 Jul 2019 Electronic form version 1.4