INSTITUTE OF PLASMA PHYSICS
OF THE CZECH ACADEMY OF SCIENCES

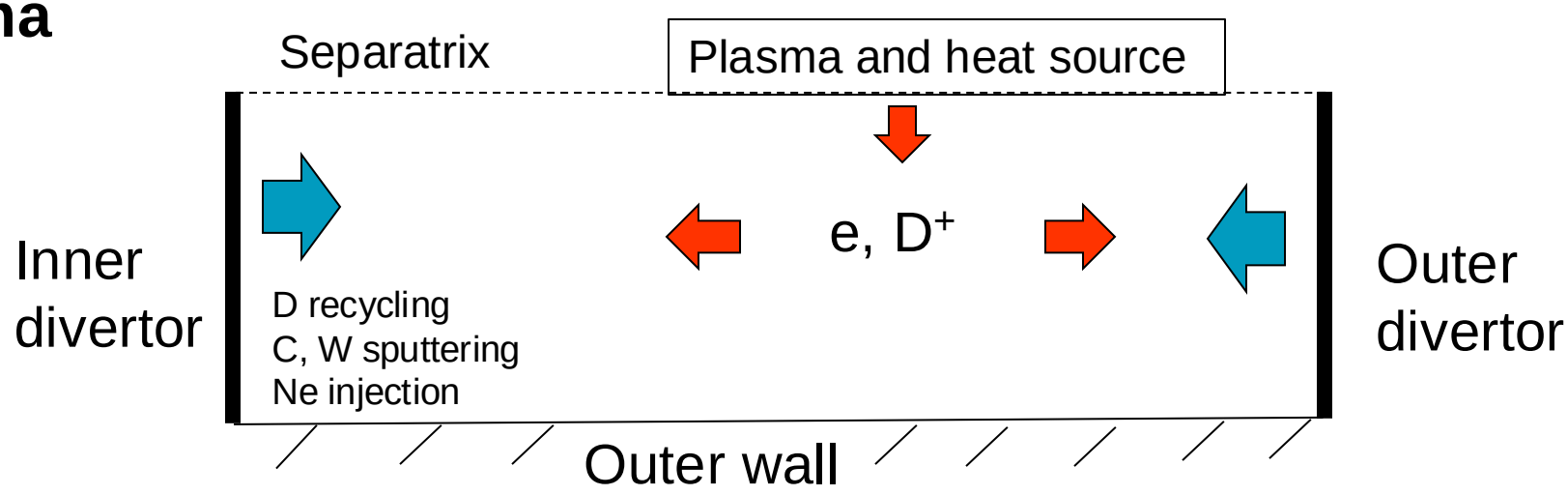
BIT1 training

BIT1 team

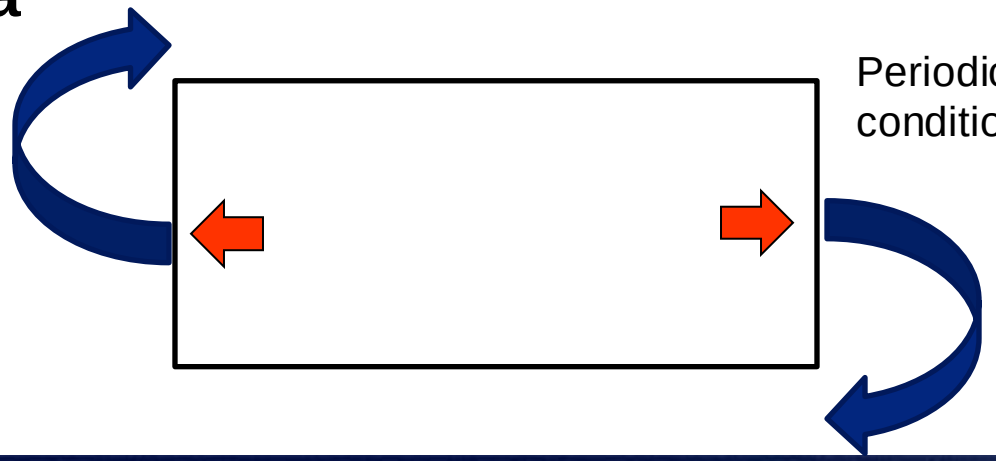
MINISTRY OF EDUCATION,
YOUTH AND SPORTS

BIT1 models

Bounded plasma



Unbounded plasma



We can study plasma oscillations

$$\omega_{plasma} = 56.4 \times \sqrt{n}, \qquad n\left[m^{-3}\right]$$

path to the execution script (run.sh):
/ceph/hpc/home/vega002/hromadka

BIT1 models

path to the input file (unb_B.inp):
/ceph/hpc/home/vega002/hromadka/runs

path to the execution script (run.sh):
/ceph/hpc/home/vega002/hromadka

Unmagnetized plasma

Simulation parameters

System size and simulated time

$$L >> \lambda_{Debye}$$

$$\tau_{sim} \sim \frac{L}{V_{Thermal,ion}}$$

Resolution

$$\Delta t < \frac{0.2}{\omega_{plasma}}$$

$$V_{\max}\Delta t < \Delta x < \lambda_{Debye}$$

$$V_{\max} \sim 5V_{Thermal,el}$$

$$L = 1\ cm$$

$$n = 10^{19}\ m^{-3}$$

$$T_e = T_i = 10\ eV$$

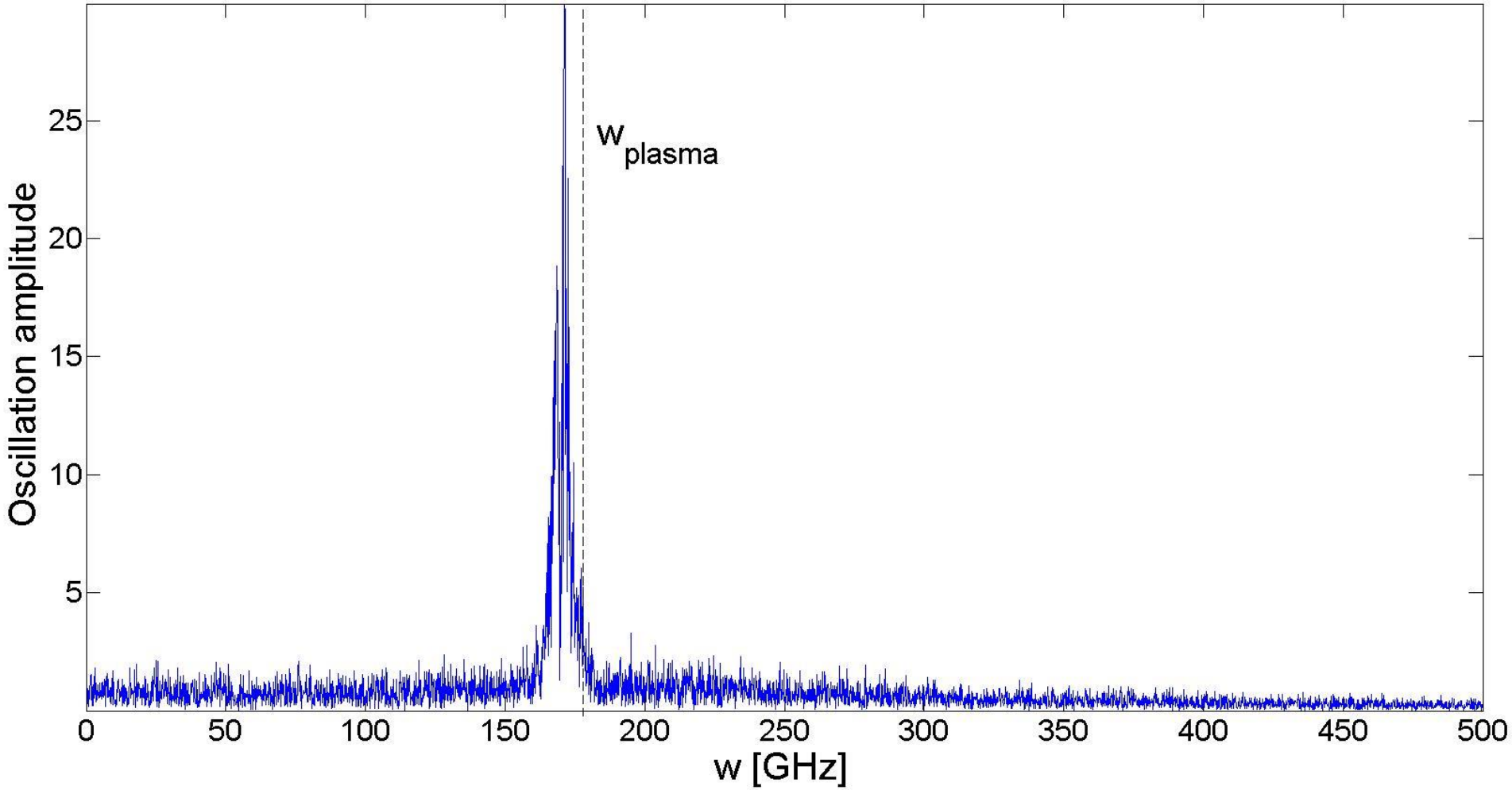
$$\lambda_{Debye} = \frac{V_{Thermal}}{\omega_{plasma}}$$

Output

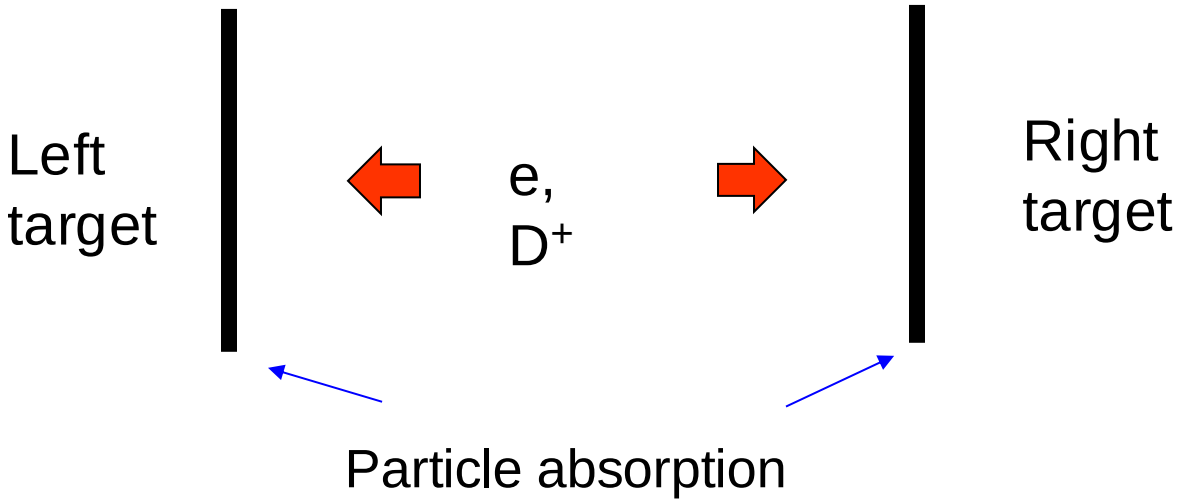
$$\phi(t) \Rightarrow \phi_w$$

Fourier transf.

Potential oscillation spectrup



Sheath modelling



Potential drop between the plasma and the target

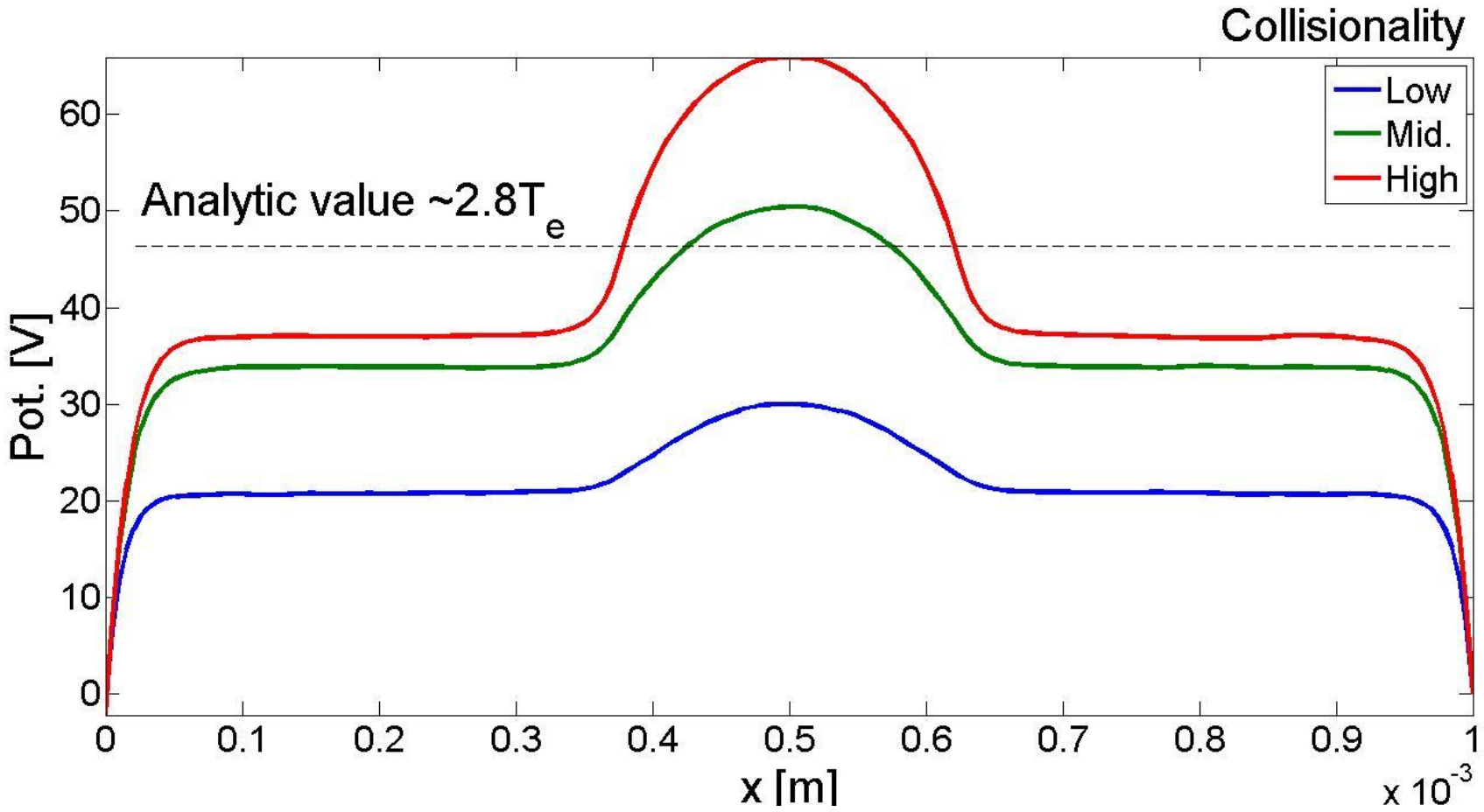
$$\Delta\phi \sim \ln\sqrt{M_i/m_e} \sim 2.8T_e$$

The same simulation parameters

$$L = 1\ cm$$
$$n = 10^{19}\ m^{-3}$$
$$T_e = T_i = 10\ eV$$

Will we get correct the potential drop?

Simulations of S. Vrba



Explanation