Main parameters

”flattened” function distribution of the electrons;

longitudinal temperature of the electrons;

transversal temperature of the electrons;

initial temperature of the ions;

density of the cooling electron beam;

magnetic field of the cooling section;

length of the cooling section;

time of the passage of the ion through the cooling section;

cyclotron frequency of the electrons;

plasma frequency of the electron beam;

longitudinal rms velocity of the electrons;

transversal rms velocity of the electrons;

Larmor radius of the electrons;

rms Larmor radius of the electrons;

number of cyclotron revolutions of the electron during the time of the interactions with ion;

number of the electrons inside “Debye” sphere with “radius”  for low electron density or for small : ;

number of Larmor radii as intermediate section of impact parameter: ;

factor in expressions for friction forces;

Minimal impact parameter  and other values:

|  |  |  |  |
| --- | --- | --- | --- |
| Parameters | Ion velocity | | |
| “H”: High | “L”: low | “S”: superlow |
|  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

maximal impact parameter;

Coulomb logarithm :

|  |  |  |  |
| --- | --- | --- | --- |
| Type of interaction between ion and electron | Ion velocity | | |
| “H”: High | “L”: low | “S”: superlow |
|  |  |  |
| Fast  (“F”): |  |  |  |
| Adiabatic  (“A”): |  |  |  |
| Magnetized  (“M”): |  |  |  |

Friction force  (along the ion velocity):

|  |  |  |  |
| --- | --- | --- | --- |
| Type of interaction between ion and electron | Ion velocity | | |
| “H”: High | “L”: low | “S”: superlow |
|  |  |  |
| Fast  (“F”): |  |  |  |
| Adiabatic  (“A”): |  |  |  |
| Magnetized  (“M”): |  |  |  |

Friction force  (across the ion velocity):

|  |  |  |  |
| --- | --- | --- | --- |
| Type of interaction between ion and electron | Ion velocity | | |
| “H”: High | “L”: low | “S”: superlow |
|  |  |  |
| Fast  (“F”): |  |  |  |
| Adiabatic  (“A”): |  |  |  |
| Magnetized  (“M”): |  |  |  |

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