Particle and energy balance in low-density plasma discharges
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nearly-collisionless, unmagnetized plasma discharges, it is shown that electron par-
ticle and energy balance can be found from a model that includes 1) the energy
distribution of the newborn electrons, 2) the rate of heating of confined electrons by
collisions with more energetic electrons, and 3) the rate at which confined electrons
are lost over the confining potential barrier. The ion flux density at the wall is
reduced by charge-exchange collisions, thus these ion collisions must be included in
particle balance. The model is applied to a simple, low-density, hot-filament dis-
charges such as those in the double plasma device. The plasma density, electron
temperature, and confining potential are shown to have approximately the values
given by the model.

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