

## 12.d Monte Carlo Simulations

- Problem: How to simulate and understand self-charge stabilization (electrostatic self-servos for sample charge control)
- Solution: Use SIMION with complex user programs and Monte Carlo techniques to investigate the nature of charge balance points.



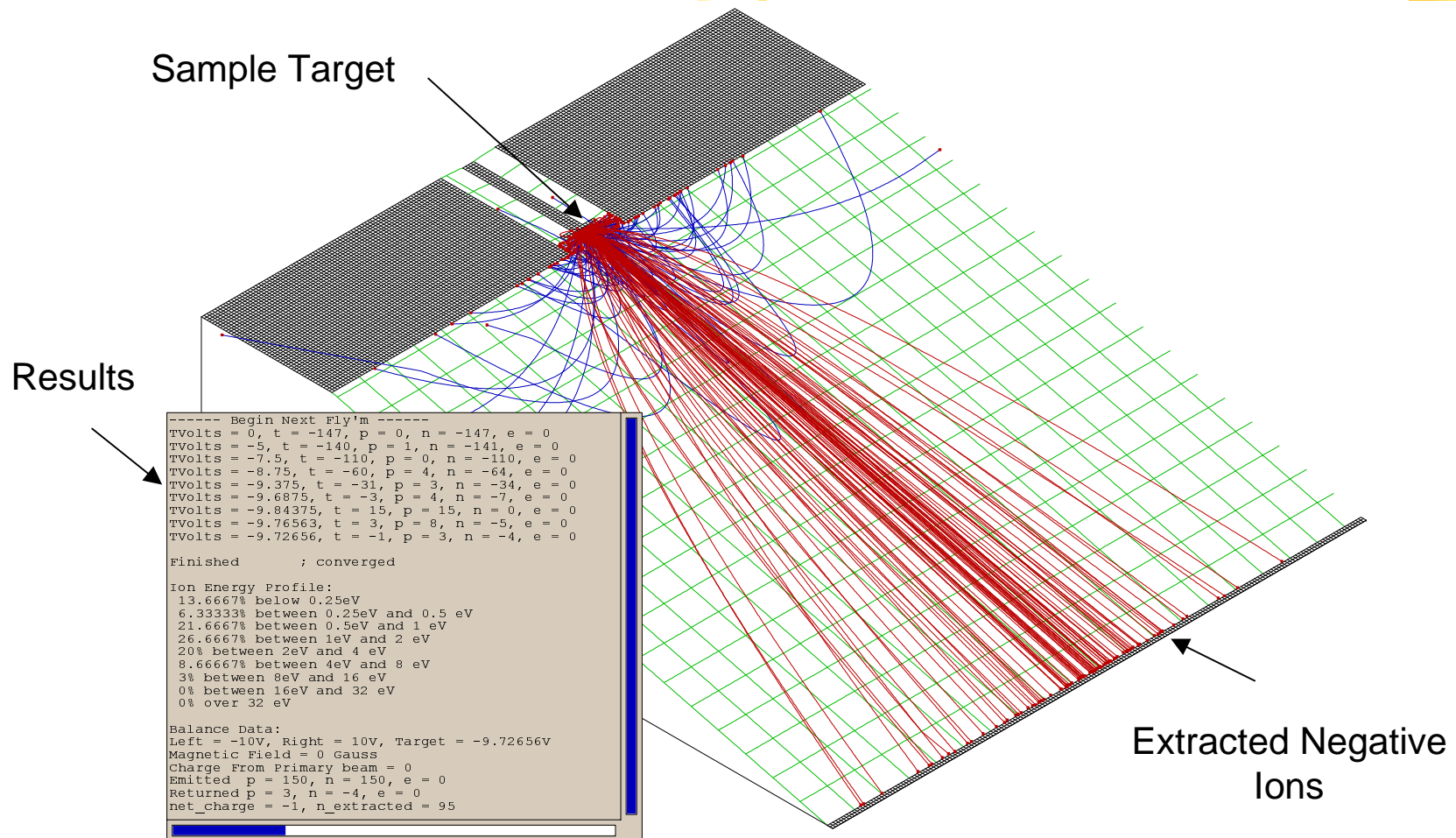
# Tricks Used



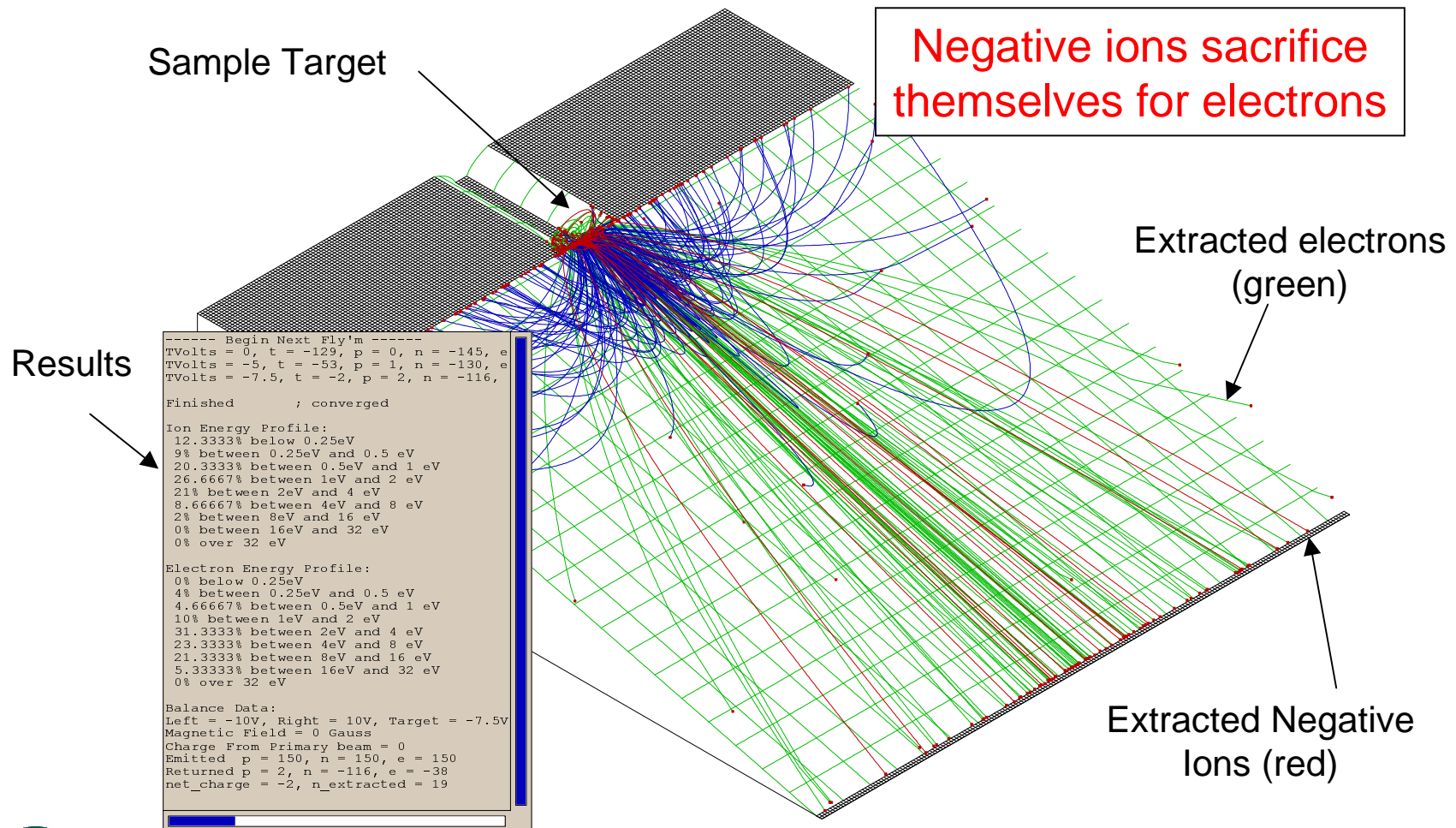
- 6th order power functions used to simulate secondary ions and electron ke
- Simulation keeps track of all charge entering, leaving, and returning
- Target's potential adjusted for charging direction on each successive rerun (binary)
- Simulation terminates when charge balance criteria are met



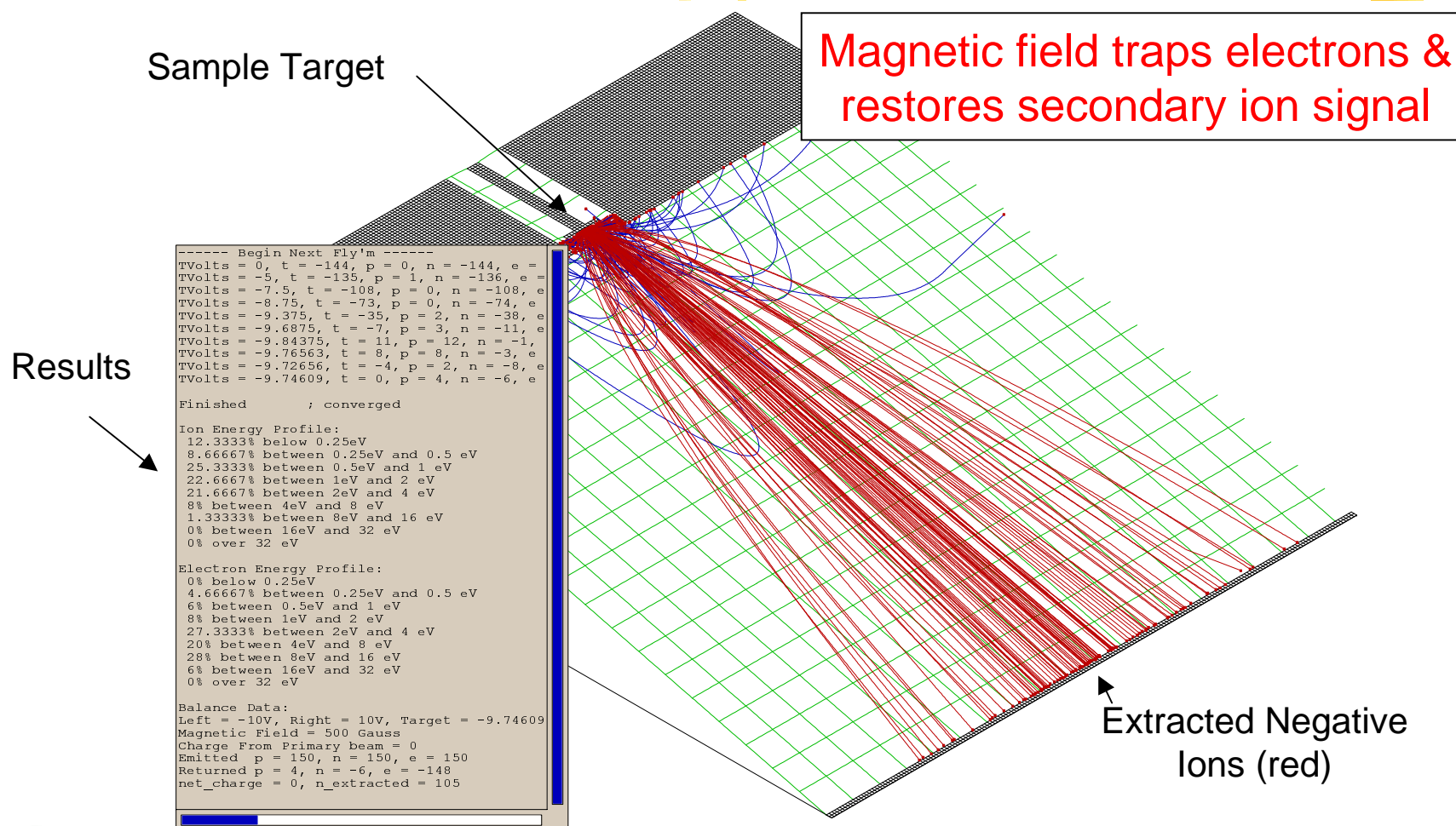
# Example of Charge Balance



# Charge Balance (electrons)



# Charge Balance (electrons) with Magnetic Field Suppression



# For More Information



- See the Monte Carlo demo in the user program reference directories
- Useful strategies
  - Complex control
  - Secondary ion and electron energy distribution
  - Data recording and display
  - Magnetic field inclusion

