Collision area is σ_c
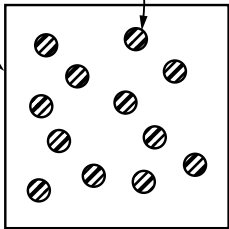
unit area

Total area covered is $\sigma_c n_0\, dx$