$$N_{hits} = \frac{\sum_{n=1}^{100} n^2 P(n, A_\sigma \rho)}{\sum_{n=1}^{100} n P(n, A_\sigma \rho)} = \frac{\langle n^2 \rangle_{n>0}}{\langle n \rangle_{n>0}} = \frac{\langle n^2 \rangle}{\langle n \rangle} = \frac{(A_\sigma \rho)^2 + A_\sigma \rho}{A_\sigma \rho} = A_\sigma \rho + 1$$