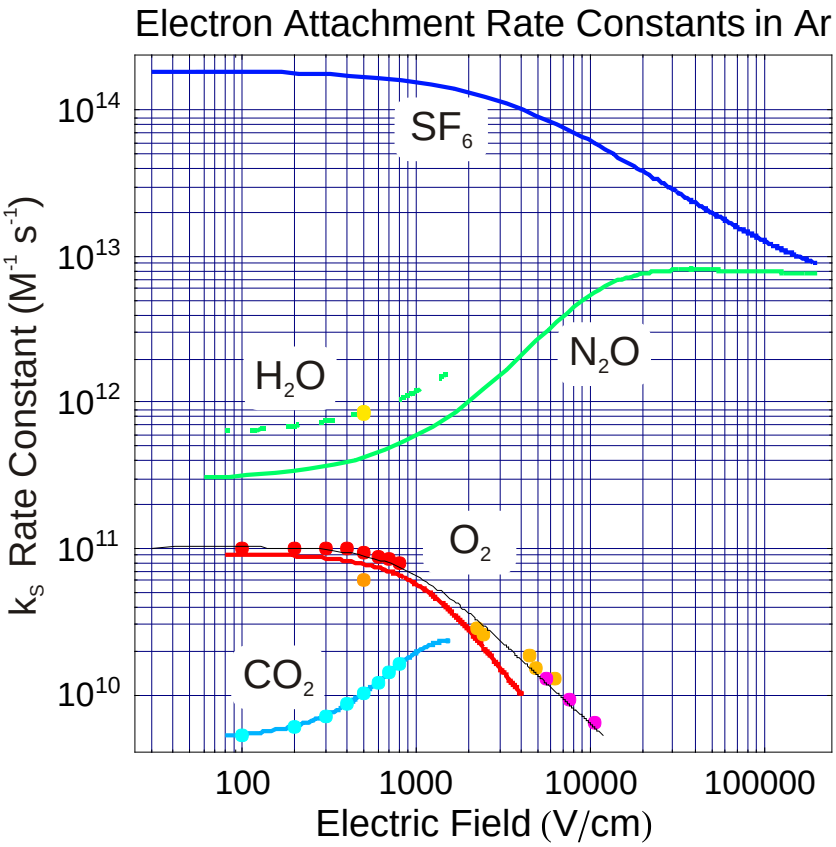
Electron attachment [33, 34, 35, 36]



The solid lines for O_2, N_2O, and SF_6 are from Bakale, Sowada, and Schmidt [33]; the red points for O_2 and all the points for CO_2 are from Bettini (ICARUS) [34]; for O_2 the orange points are from Aprile, Giboni, and Rubbia [35] (at 500 V/cm) and from Adams, *et al*. [36] (for the points above 2kV/cm), and the magenta points are from Hofmann, et al. [37]; and the yellow point for H_2O is from μBooNE docDB 429-v1 and the dashed curve is the curve for N_2O scaled to this point. The solid black line is a best fit, specified below, to the data for O_2.

$$Q(t) = Q_0\, Exp(-t/\tau_A)$$

with $\tau_A = (k_S\, n_S)^{-1}$

k_S is electron attachment rate constant in $M^{-1}\, s^{-1}$

n_S is molar (M) solute concetration in LAr

$1\ \mathrm{M} = 2.503\times10^{-8}\, \rho_{LIQUID}(T)\times \mathrm{ppb}$

the attachment rate constant depends on electric field

$$k_S = \frac{p_0 + p_1 E + p_2 E^2}{1 + q_1 E + q_2 E^2 + q_3 E^3}$$

with $p_0 = 348.066$ $p_1 = 44068.9$ $p_2 = 27.3268$

$q_1 = 4351.98$ $q_2 = 1.88415$ $q_3 = 0.00478478$

E *is in* V/cm