# A NEW LOOK AT THE $O_2$ QUENCHING OF AN EXCITED ELECTRONIC STATE OF *PARA*-DIFLUOROBENZENE

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The venerable phenomenon of electronic state quenching has long been studied, with most interactions based on molecular oxygen. While the effects are well established, theoretically interpreted and widely applied, a number of mysteries concerning details of quenching mechanism still remains. We have investigated quenching of gas phase $S_1$ *para*-difluorobenzene (*p*DFB) over an unusually wide $O_2$ pressure range, from 1 to $10^4$ Torr. We have also explored the quenching dependence on selected $S_1$ vibrational states. These experiments yield the absolute quenching rate constants in the context of a quenching model that is consistent with the non-linear Stern-Volmer behavior. Finally, we discuss how this study relates to high pressure quenching that transforms the *p*DFB fluorescence spectrum and allows the absolute vibrational energy transfer rate constants to be measured for regions of high state densities where traditional methods fail.