Breakdown Voltage vs. Pressure
Paschen's Law and "The "Paschen Curve"

In 1889, F. Pashchen published a paper (*Wied. Ann.*, **37**, 69) which set out what has become known as Paschen's Law. The law essentially states that, at higher pressures (above a few torr) the breakdown characteristics of a gap are a function (generally not linear) of the product of the gas pressure and the gap length, usually written as V= f(*pd*), where *p* is the pressure and *d* is the gap distance.

Extensive additional experiments for different materials, lower pressures, different gases and a variety of electrode shapes have expanded the data set involved. Below is shown the "Paschen Curve" for air, two flat parallel copper electrodes, separated by 1 inch, for pressures between $3x10^{-2}$ torr and 760 torr..

As the pressure is reduced below a torr (as shown in the diagram below) the curve of breakdown voltage versus pressure reaches a minimum, and then, as pressure is further reduced, rises steeply again.