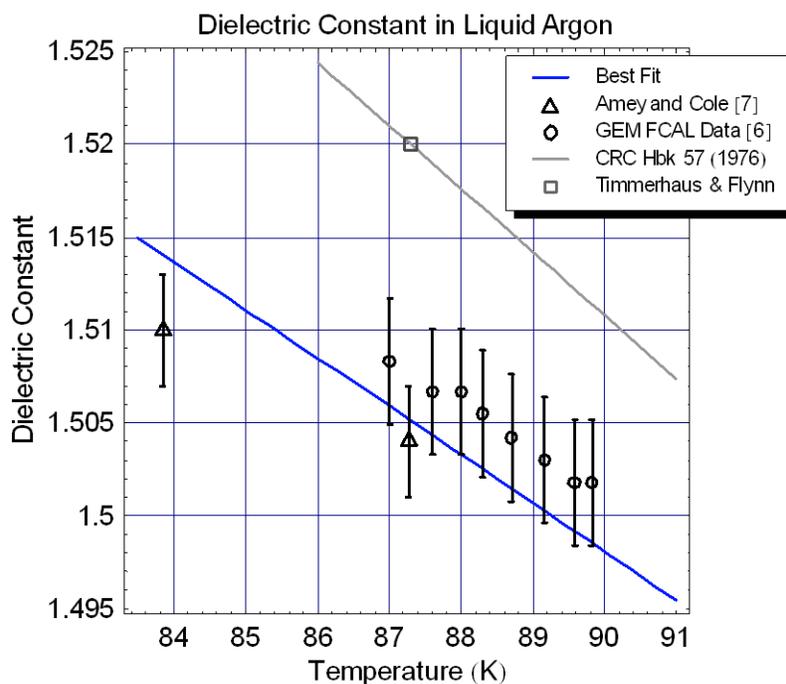


Dielectric constant [6, 7]



Data are points from:

[Circles] W. Don Carlos, et al., *Experimental data on GEM LAC FCAL tube design*, GEM TN-92-179 (1992) (unpublished).

[Triangles] R.L. Amey and R.H. Cole, *Dielectric constants of liquefied noble gases and methane*, J. Chem. Phys. **40** (1964) 146.

[Gray line] *The Handbook of Chemistry and Physics*, 57th edition, CRC Press (1976). Page E-55 gives the value of 1.53₈ for the value of the dielectric constant at 82.15K, with a linear temperature slope of $-0.34 \times 10^{-4} \text{ K}^{-1}$.

[Gray square] K.D. Timmerhaus and T.M. Flynn, *Cryogenic Process Engineering*, Plenum Press NY (1989), p20 gives $\kappa=1.52$ at the normal boiling point.

Clausius-Mossotti relation:

$$\kappa = \frac{1 + 2\alpha_{CM}\rho_L}{1 - \alpha_{CM}\rho_L}$$

κ = dielectric constant of the liquid

ρ_L = liquid density (see density section above)

with $\alpha_{CM} = 0.1033 \text{ cm}^3/\text{gm}$

for $T_T < T < T_C$