The following are some of the frequently asked questions for Viva of the Four Probe Experiment, to determine the resistivity and Energy Band gap of a semiconductor.

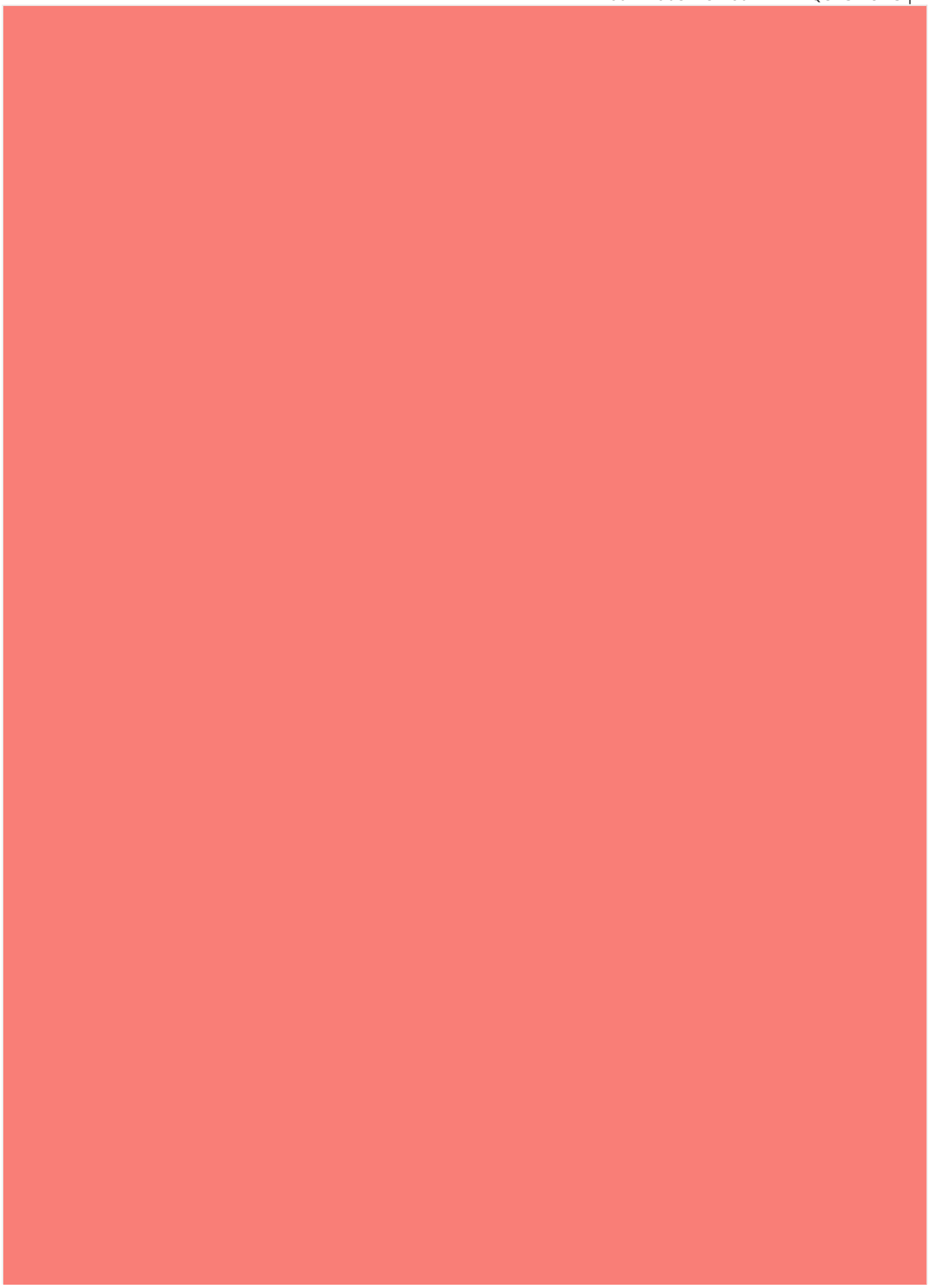
1. *Why is Four-Probe method preferred over other conventional methods for measuring resistivity?*
2. *Why is the current kept constant for measuring the resistivity of a semiconductor using four probe at different temperatures?*
   A. In Four Probe Method, the voltage across the inner two probes at different temperatures is recorded. This voltage is an indication of resistance or resistivity only if V is proprtional to R or I is constant. This is why a constant current source is necessary.
3. *How do the conductivities of metals and semiconductor depend on temperature?*
   A. The conductivity of a semiconductor increases with increasing temperature while that of a metal decreases with increasing temperature.
4. *What is the equation giving the variation of conductivity/resistivity of a semiconductor with temperature?*
   A. Resistivity:
   $$\rho = \rho_0 e^{E_g/2kT}$$
   $$\sigma = \sigma_0 e^{-E_g/2kT}$$
5. *For calculating the band gap from resistivity measurements why is it recommended to heat the sample over 100 degree Celsius?*
6. *What are the values of band gaps for Silicon and Germanium?*
7. *How does the band gap of a semiconductor vary with temperature?*

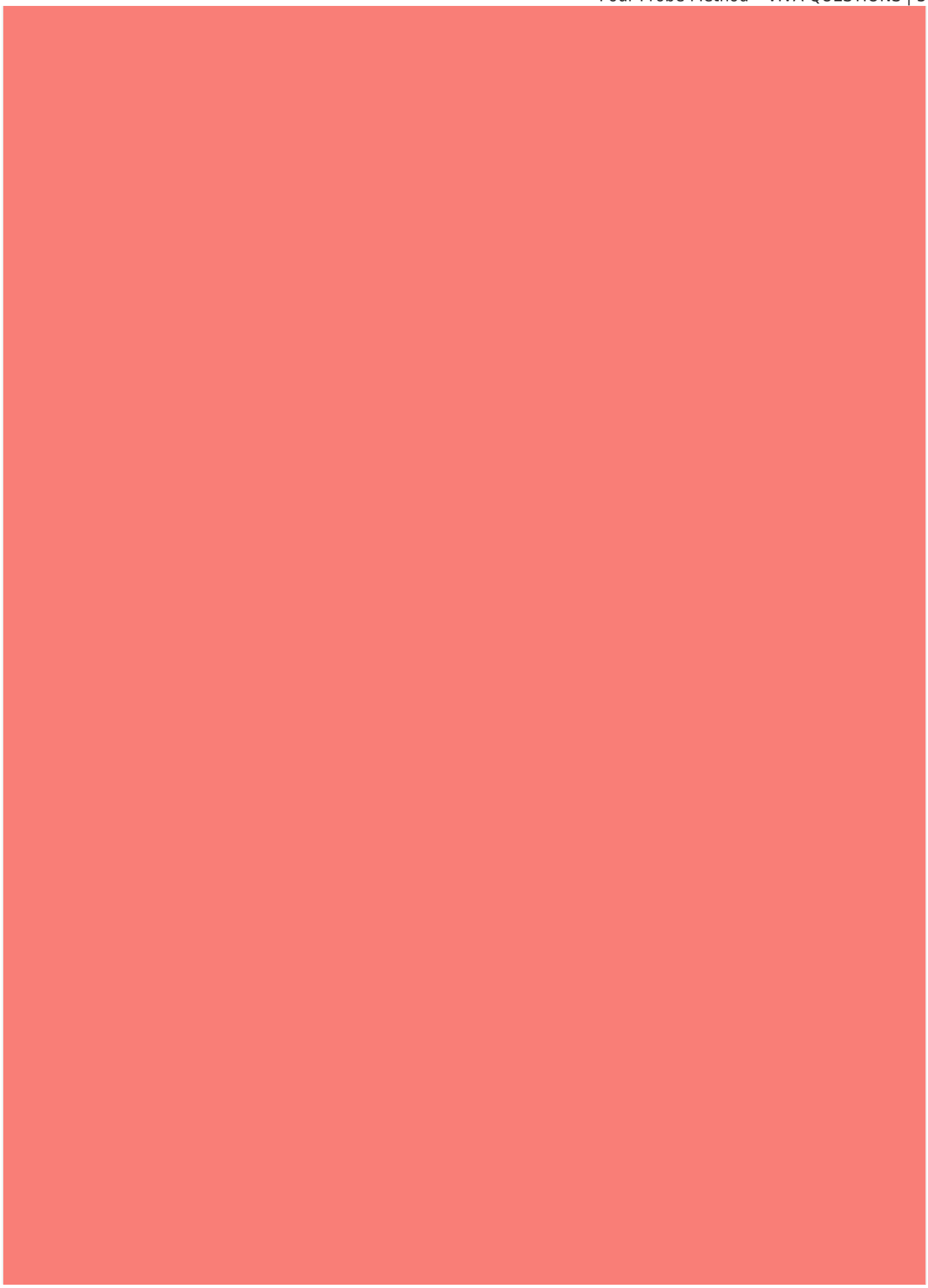
Video:

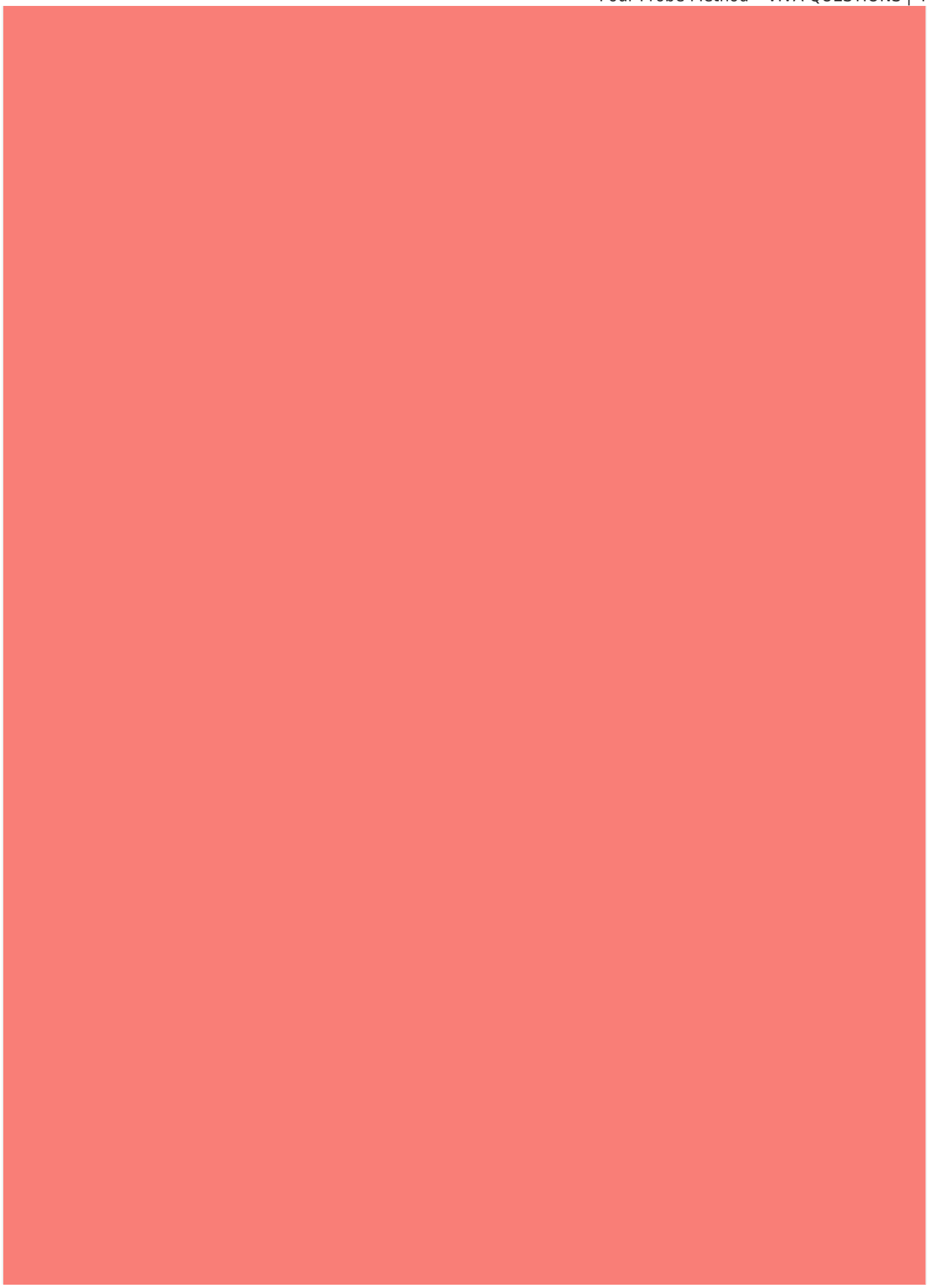
Manas Sharma

I'm a physicist specializing in computational material science with a PhD in Physics from Friedrich-Schiller University Jena, Germany. I write efficient codes for simulating light-matter interactions at atomic scales. I like to develop Physics, DFT, and Machine Learning related apps and software from time to time. Can code in most of the popular languages. I like to share my knowledge in Physics and applications using this Blog and a YouTube channel.

manas.bragitoff.com/







Share this:

Click to share on Facebook (Opens in new window)

Click to share on Twitter (Opens in new window)

Click to share on WhatsApp (Opens in new window)

Click to share on Pinterest (Opens in new window)

Click to share on Reddit (Opens in new window)

Click to share on LinkedIn (Opens in new window)

Click to email a link to a friend (Opens in new window)

Click to print (Opens in new window)

Click to share on Tumblr (Opens in new window)

Click to share on Pocket (Opens in new window)

Click to share on Telegram (Opens in new window)

[wpedon id="7041" align="center"]