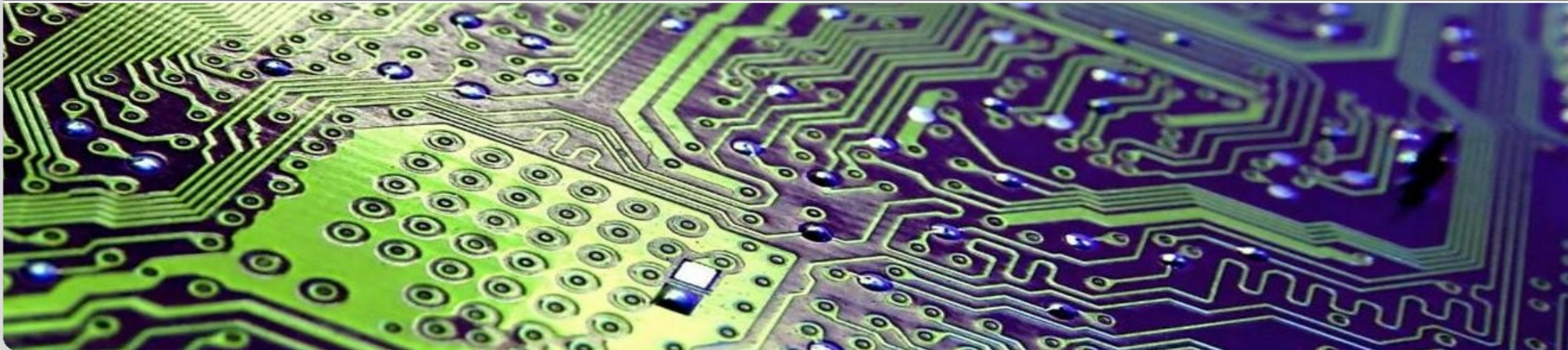


Safety for Chips from Electro-Static Discharge



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Disclaimer

- This is not an experts guide, just some rough guidelines!

Electro-Static Discharge (ESD)

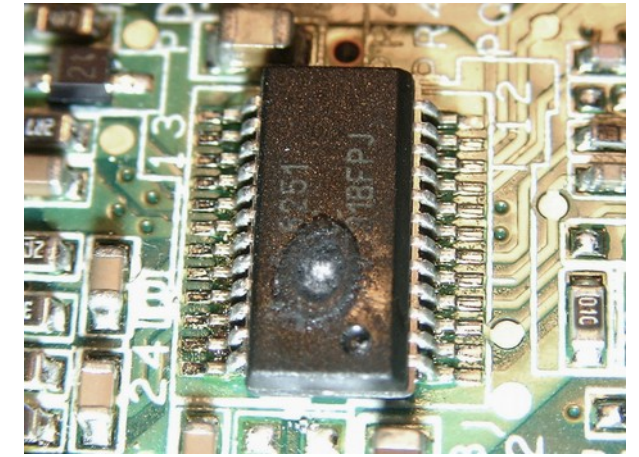
- Can damage electronic devices
- Discharge from a high difference in electrical potential
 - “Charged-up humans”, isolated through shoes etc. from ground potential
- Make sure to have almost the same potential to not damage the components



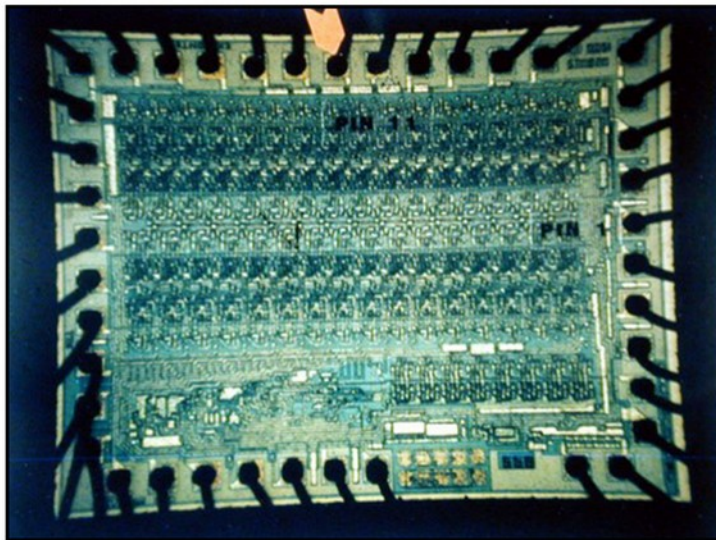
Electro-Static Discharge (ESD)

- Low discharge will not immediately destroy chips
 - But they can degrade components over time
 - Most chips sustain a few shocks, but they still degrade

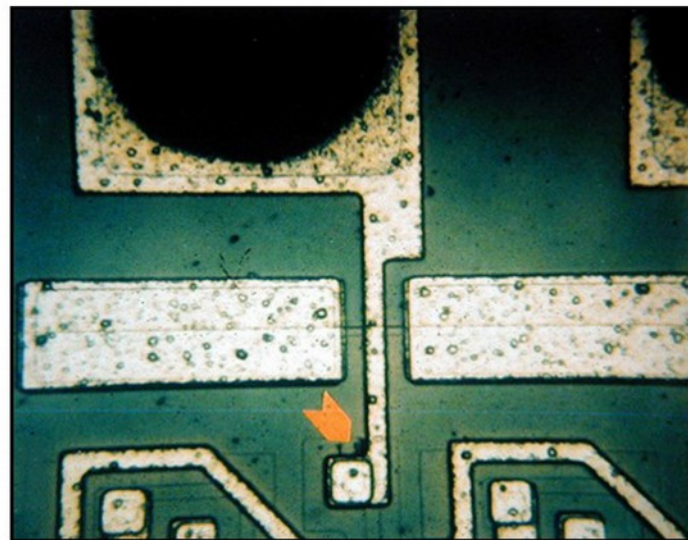
Visible extreme case:



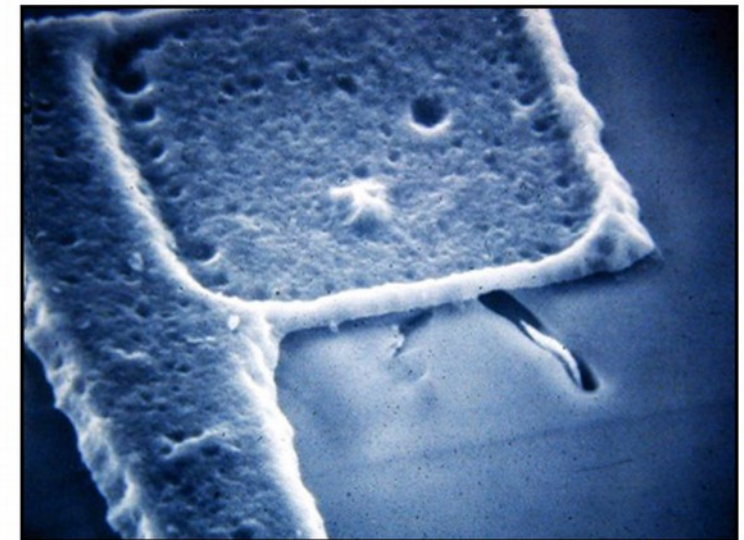
ESD Damage on an Integrated Circuit (noted by arrow)



No magnification



400 x magnification

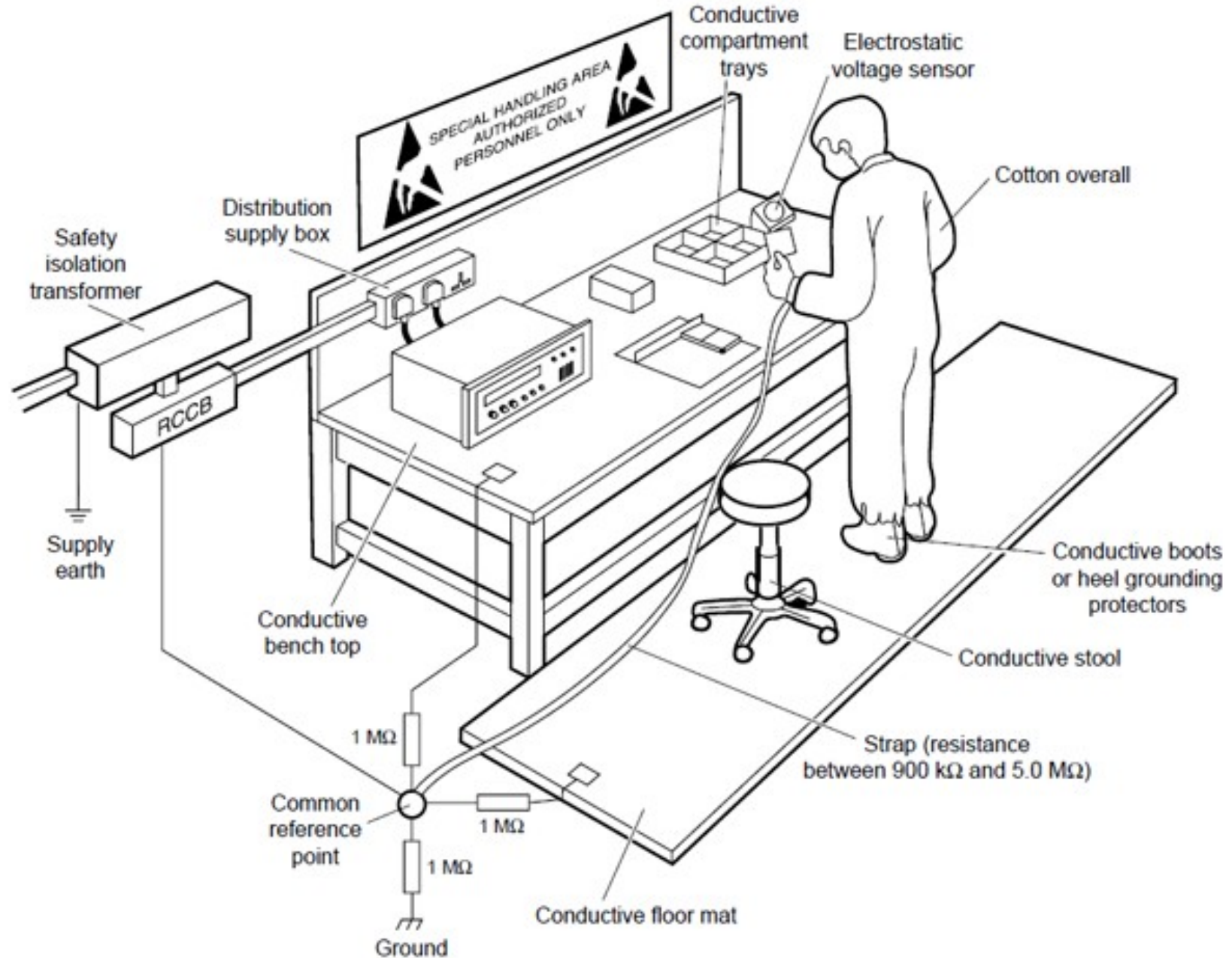


5,000 x magnification

Photos courtesy of Hi-Rel Laboratories Inc., Spokane, WA

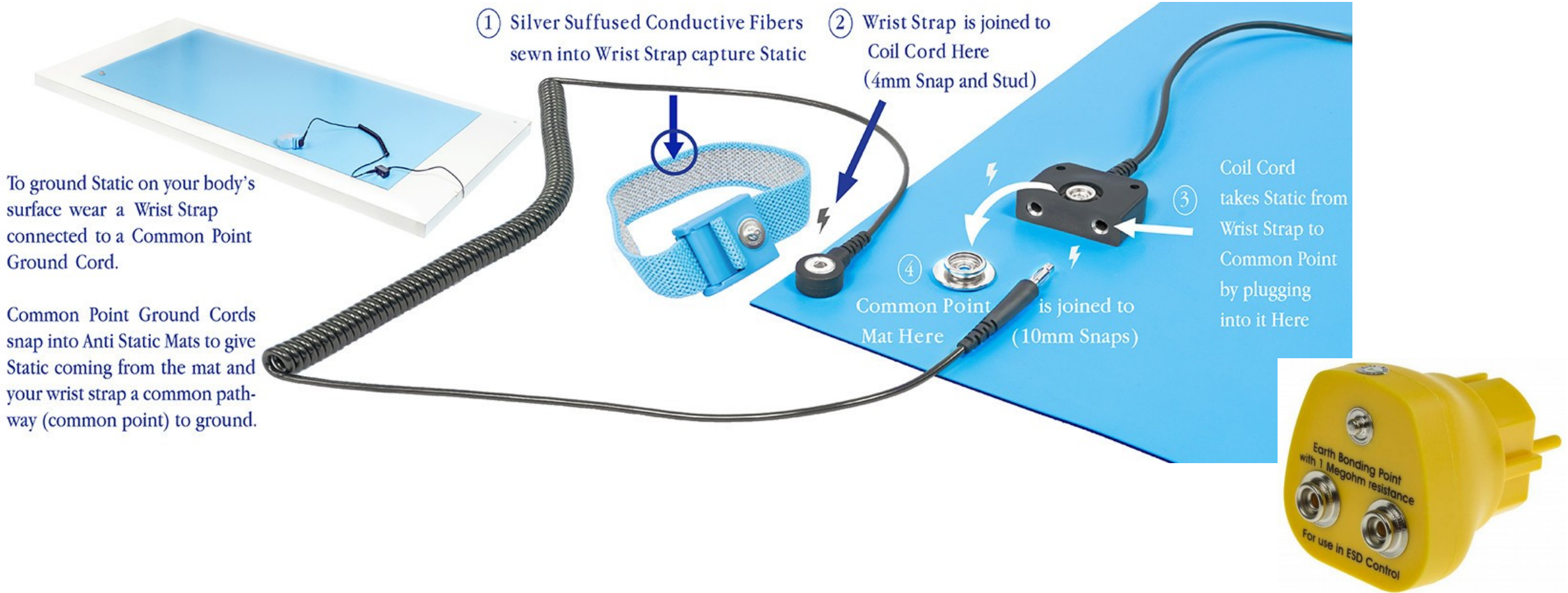
How to be ESD Safe?

- For sensitive components:



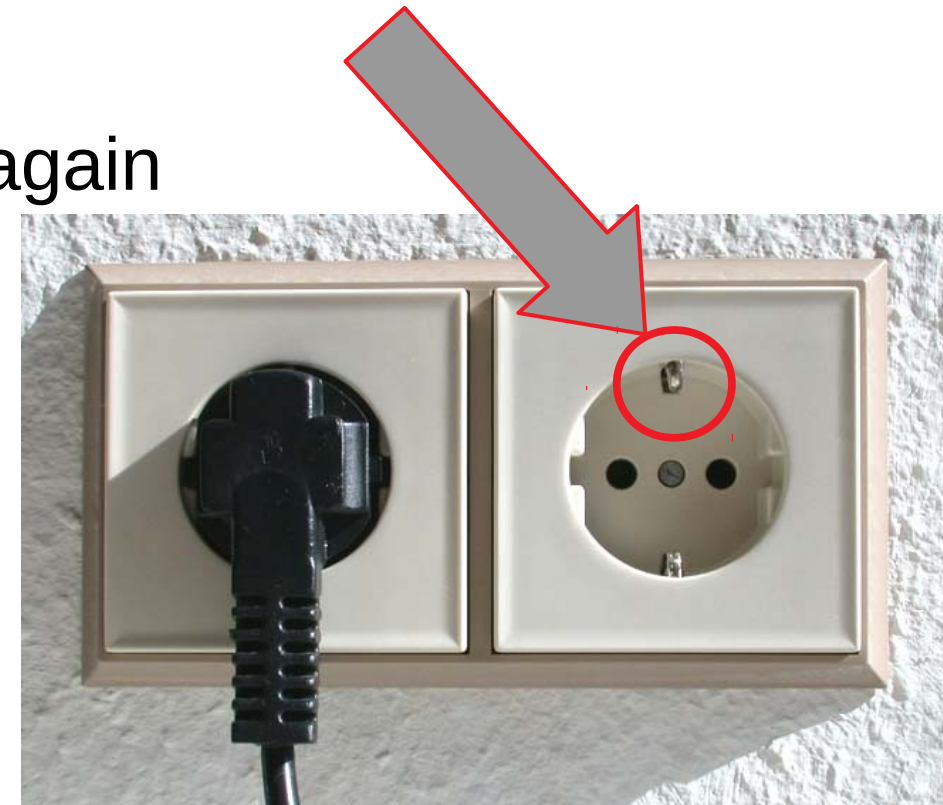
How to be ESD Safe?

■ Typical



How to be sufficiently ESD-safe in this lab...

- Simply follow these steps:
 1. Touch metallic part of a properly grounded object
 - i.e. metallic PC cases, metallic heating, safety potential of wall plug
 2. Now you can touch the board
 3. If you create more static, ground yourself again
 - Walking over carpet
 - Walking with isolated shoes (winterboots)
 - ...
 - But don't worry too much
- Please be careful, – but without visible damage on the board, we won't blame you



- That's it...
- Questions?