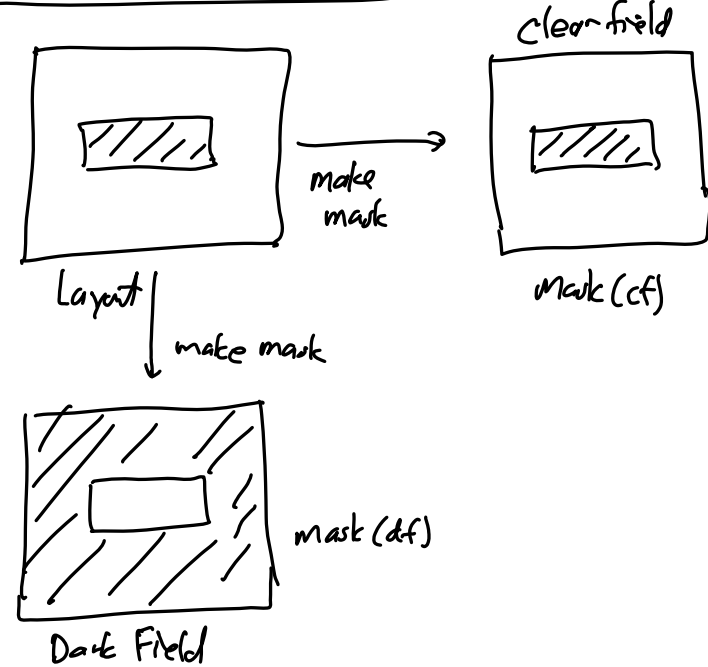


Lecture 9: Surface Micromachining I

- Announcements:
- HW #2: Due next Tuesday
- -----
- Today:
- Reading: Senturia Chpt. 3, Jaeger Chpt. 11,
Handout: "Surface Micromachining for
Microelectromechanical Systems"
- ↳ Lecture Topics:
 - ↳ Polysilicon surface micromachining
 - ↳ Stiction
 - ↳ Residual stress
 - ↳ Topography issues
 - ↳ Nickel metal surface micromachining
 - ↳ 3D "pop-up" MEMS
 - ↳ Foundry MEMS: the "MUMPS" process
 - ↳ The Sandia SUMMIT process
- -----
- Last Time:
- Finished Module 4
- Start Module 5 (Surface Micromachining)

over

Clear Field & Dark Field Masks



- Straight or Sloped Sidewalls:
- Often want sloped sidewalls in order to reduce the sharpness of corners
 - ↳ Easier to deposit over
 - ↳ Sharp corners concentrate stresses
 - ↳ High stress can weaken structures creating a reliability concern
 - ↳ High stress can dissipate energy, lowering Q
- When you want straight sidewalls (e.g., for lateral electrostatic drive), use a hard mask
 - ↳ PR can't last for thick structures
 - ↳ A hard mask suppresses angle transfer

