With DDS3 we saw bookshelving-like effects during the stacking stage.

but somehow we decided to go ahead with D.Bonding, because we felt this was some kind of a fluke.

Later at SLAC it was found that DDS3 has bookshelving accumulating up to ~50 μrad.

I hear that bookshelving Tols is ~50 μrad.
Questions to Ask

Q1. Can we detect bookshelving during the grading work.
    If so how?
    how accurately?

Q2. If we detect bookshelving, where is it coming from?

Q3. If we detect bookshelving, how can we fix it?

We are working on Q1 now. And this is what I'll talk about.
Methods for detecting Bookshelfing

4.2 Microsense

Scan with very fine steps.
- Disks had better have long 2-span w/o steps

2:2 Auto collimator (NIKON)

- Can see only the last cell.
- Reproducibility $\pm 0.2^\circ$
  ($1^\circ = 4.9\text{ mrad}$)
We have been studying effects of

1. Cell (disk) rotation
2. Area of Disk to be shielded
3. Reflection from the surface of the Vee-Block
4. Room lighting
5. Weight stress on the Vee-Block support.
   (Not Vee-Block itself yet)

So far with 1-axis A.C. only.

But on a real Vee-Block

\[ \text{Disk} \quad \leftarrow \quad \text{A.C.} \]

\[ \text{Ceramic Block} \]

\text{Entire setup tilted by 50° (actual stacking done at 45°)} \]
We'd like to be freely controlling the area to be "shined".

A handy spacer mechanism to alter the A.C. (X,Y) location is being prepared by Y. Funahashi right now.
NOTE: $\frac{0.8\mu m}{30\mu m} = 26.7\mu rad \sim 5\text{ sec}$
Vee Block Surface Covered.

Vee Block Surface Exposed.

number

number
\[ \text{Mass 1} = 7 \text{ kg}, \quad -49.0 \text{ sec} \quad 99119.64 \]
\[ 5 \text{ kg}, \quad -49.0 \quad (\text{-5 sec}) \]
\[ 17 \text{ kg}, \quad -48.9 \text{ sec} \quad 99119.65 \]
\[ 10 \text{ kg}, \quad -48.8 \text{ sec} \quad 99119.65 \]
\[ 20 \text{ kg}, \quad -48.7 \text{ sec} \quad 99119.66 \]
\[ 40 \text{ kg}, \quad -48.7 \text{ sec} \quad 99119.67 \]

Disk radius, \( r = 3.1 \text{ in} \)

1345 mm or \( 53 \)

\[ 20 \text{ kg}, \quad -48.7 \text{ sec} \quad 99119.68 \]

10 \text{ kg}, \quad -48.7 \text{ sec} \quad 99119.69

-2 \text{ kg} \quad 99119.70
Conclusions

- If A.C says it’s tilted, we’d better believe it.
- Effects of lighting is small.
- Vee Block holder appears very stiff.

- Studies on [Meas. reproducibility] cell positioning still much needed.
- Want to commission Z-axis A.C.

- Studies on portion of the disk to shine to are a bit tricky, because of the "bending" of the disk itself. So, we continue working