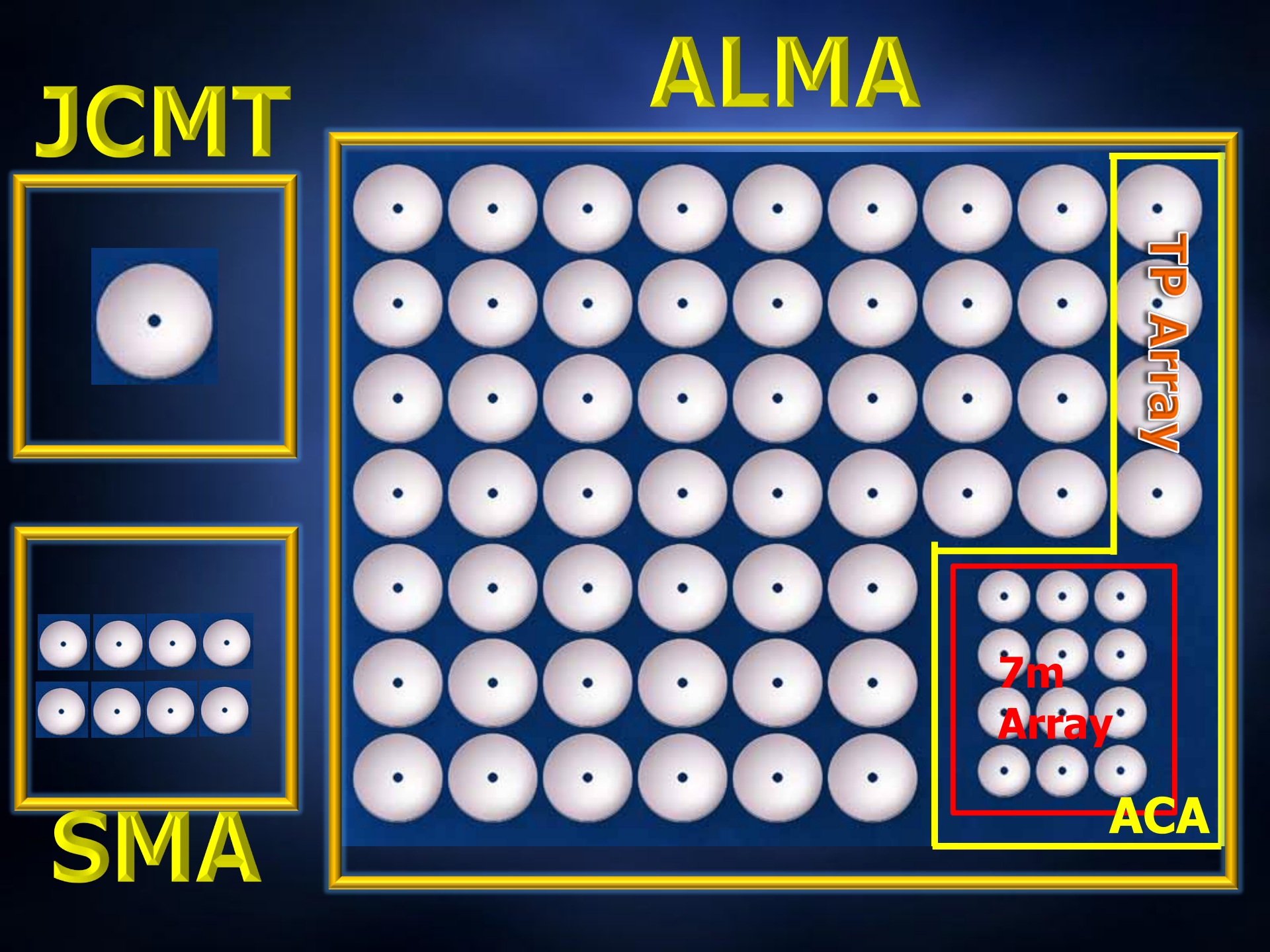
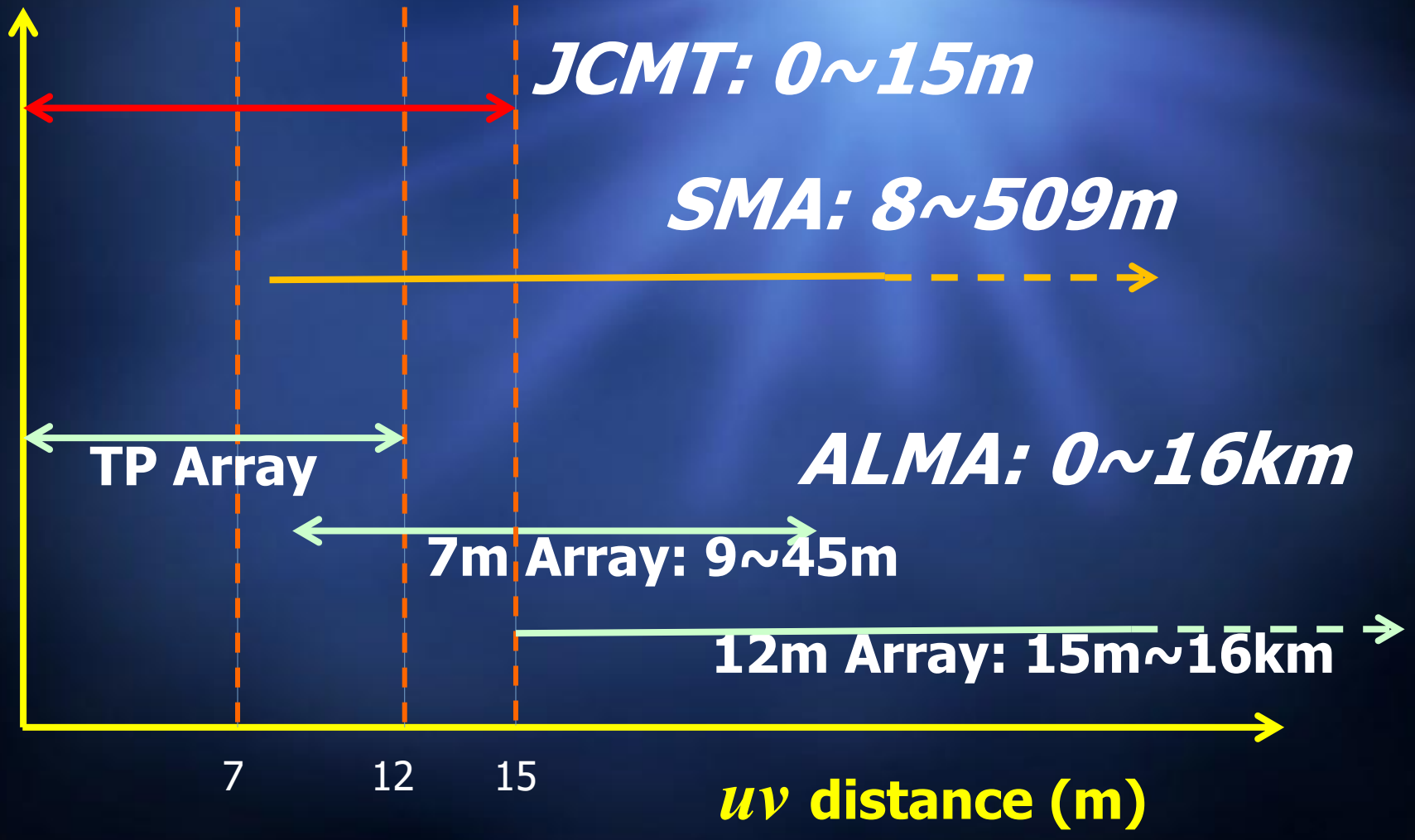
JCMT / SMA synergy

Shih-Ping Lai
National Tsing Hua University, Taiwan

Keping Chiu
Nanjing University, China


JCMT
ALMA
TP Array
7m
Array
ACA
SMA


JCMT: 0~15m
SMA: 8~509m
TP Array
ALMA: 0~16km
7m Array: 9~45m
12m Array: 15m~16km
7
12
15
uv distance (m)

SCUBA-2: the 10,000 pixel bolometer camera on the James Clerk Maxwell Telescope (Holland+ 2013)

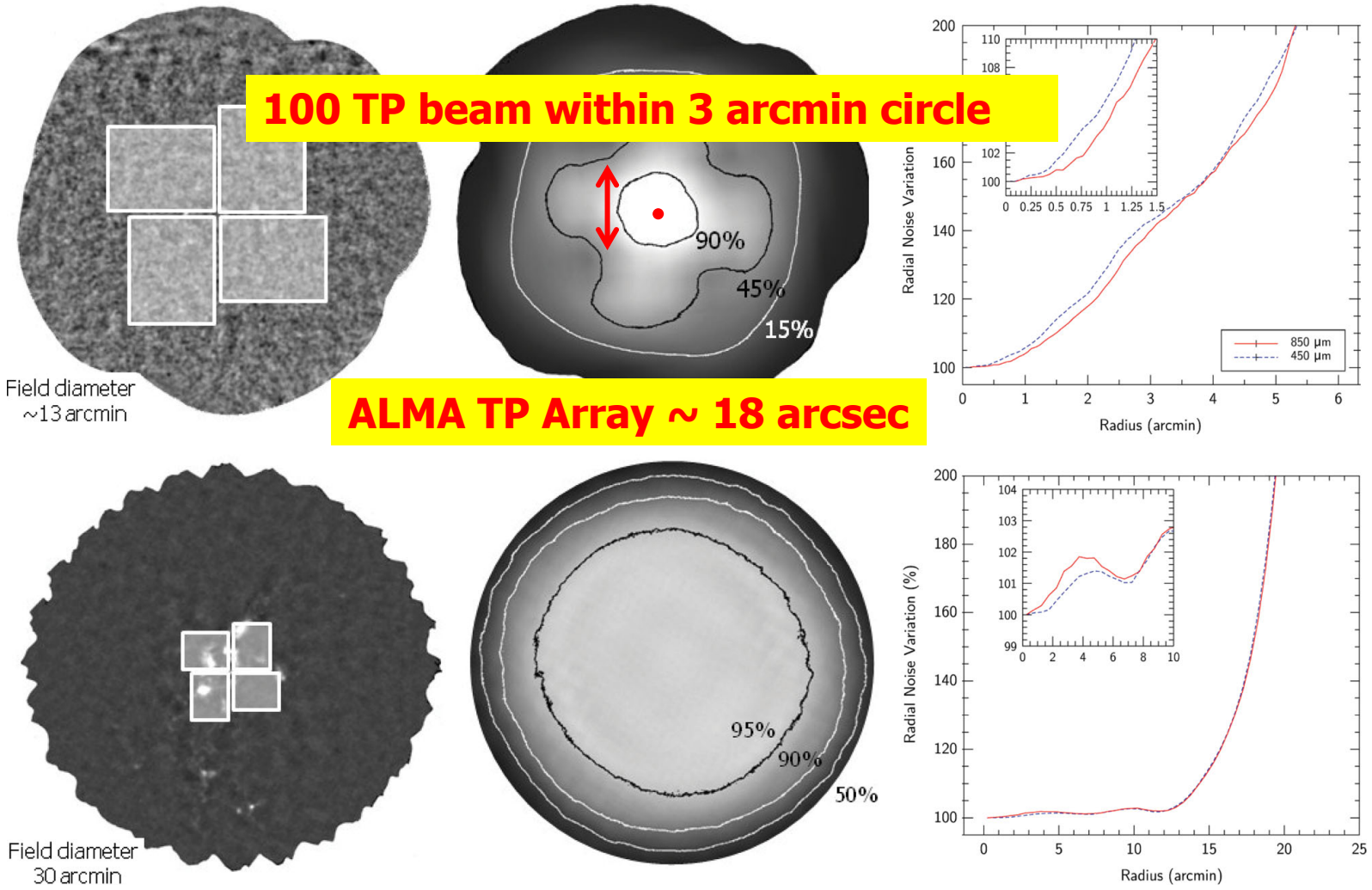


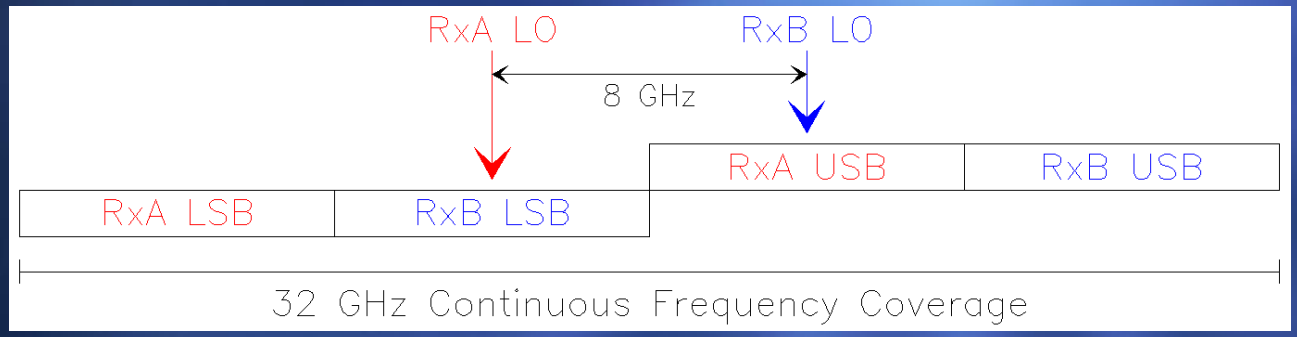
Figure 12. Left: resultant images from a typical DAISY (top) and 30 arcmin PONG (bottom) scan with the array footprint shown for scaling purposes; middle: exposure time images with contours at 90, 45 and 10 per cent of the peak value for DAISY (top) and 95, 90 and 50 per cent for PONG (bottom); right: radial noise profile in which the percentage increase in the rms noise is plotted as a function of map radius, for DAISY (top) and 30 arcmin PONG scan (bottom).

Advantage of JCMT

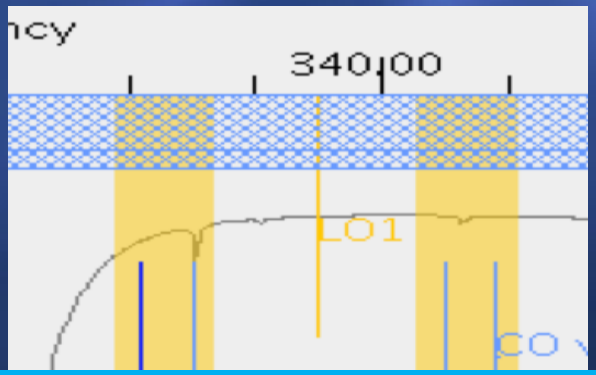
- Conducting large scale mosaic
  - Star Formation: connecting large filaments to small scale cores
  - Complete view of Nearby Galaxies
  - Extragalactic surveys
- Statistics!
- Time domain astronomy!

SMA?

- wSMA: 32 GHz/140 kHz -> 230k channels



cp: ALMA



JCMT needs to upgrade its backend, currently

- **best resolution is 30kHz in some modes (SMA: 140 kHz)**
- **widest bandwidth is only 1.8 GHz**

Ideal for Intermediate Field Images and Mosaics

Ram Rao's talk

- SMA Primary Beam is approximately 35" at 345 GHz (ALMA Band 7)
- ALMA restricted to 1/3 of Primary Beam which is approximately 6" (Band 7) – SMA has advantage here.
- *For extended sources → Factor of 36 in mapping speed*
- **Connect Large Scale Magnetic Fields with Small Scale Structure.**

Advantage of JCMT+SMA

- Conducting large scale mosaic
  - Star Formation: connecting large filaments to small scale cores
  - Complete view of Nearby Galaxies
  - Extragalactic surveys
  - Polarization
- Statistics!
- Time domain astronomy!