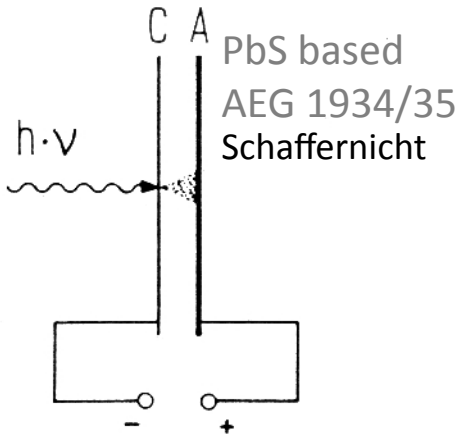
Detectors in Astronomy

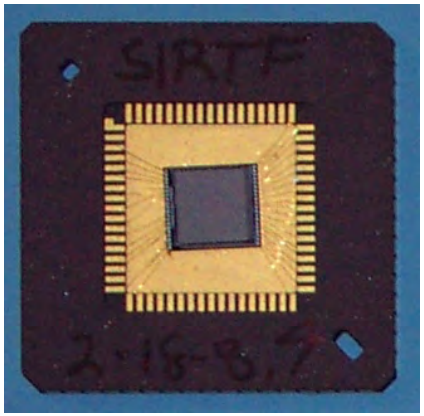


PbS based
AEG 1934/35
Schaffernicht

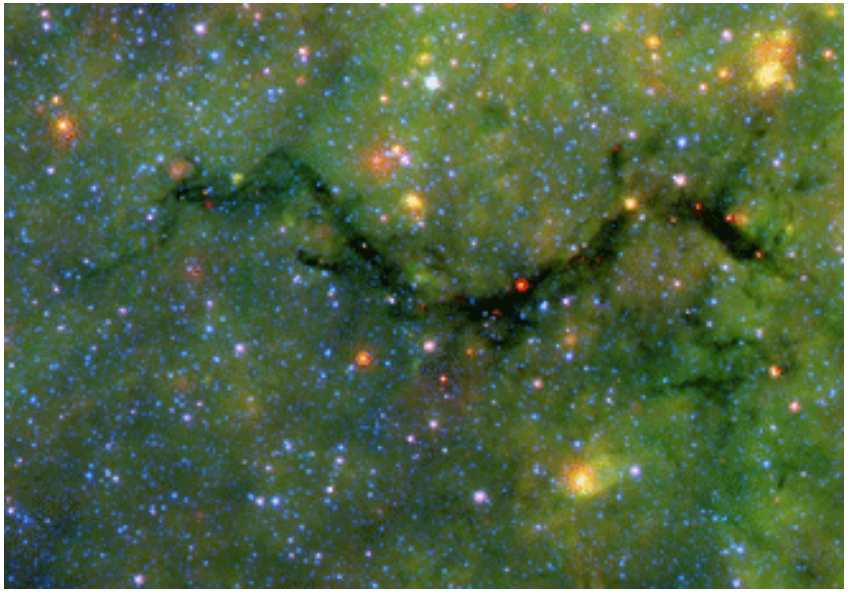
Low's first Bolometer (© G. Rieke)

Modern Development

- G. Kuiper 1947
  First IR spectrum using PbS detector
- F. Low 1961
  First Ge Bolometer
- Santa Barbara Research Center (SBRC)
  1986: 58 X 62 InSb focal plane array
- Raytheon (SBRC) 2001
  2048 X 2048 InSb prototype



58x62 InSb SBRC

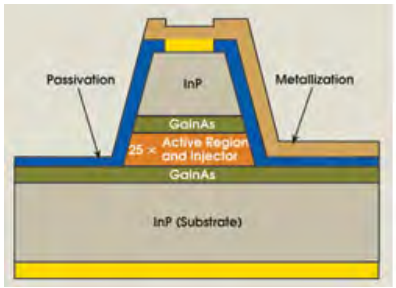


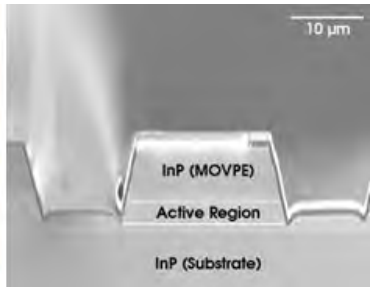
Snake
3, 8, & 24µm
NASA, Spitzer

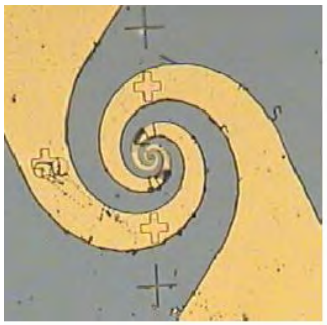
2048x2048 InSb
prototype SBRC
for JWST

Heinz-Wilhelm Hübers

- Ph.D. MPIfR & Univ. Bonn
- NASA Ames Research Center
- National Institute of Standards and Technology
- DLR Institute Berlin-Adlershof since then
- since 2009 affiliated with Technical University Berlin
  since 2014 Humbold Universität zu Berlin
- Meanwhile Director of the DLR Institute of
  Optical Sensor Systems
- Technology Development of far IR Sensorsystems
  for astronomy and physics
  - FIR Heterodyne Receiver
  - FIR Antena Structures
  - FIR Laser
  - Synchrotron Radiation in the FIR
  - CoI of GREAT instrument on SOFIA
  - Innovation Awards

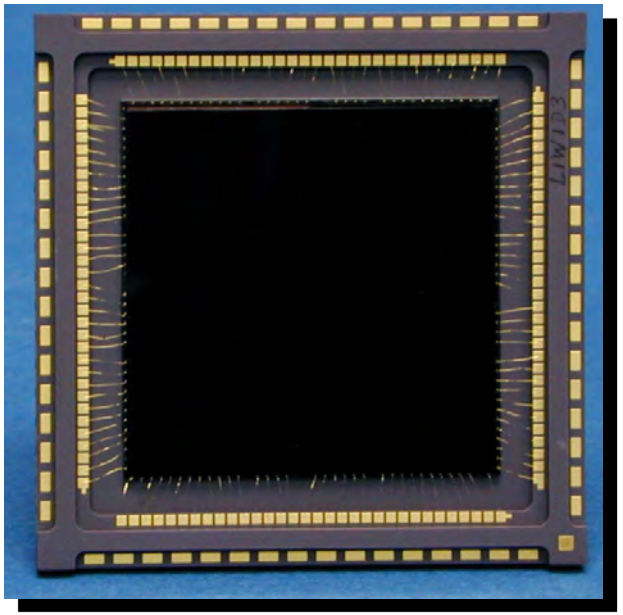






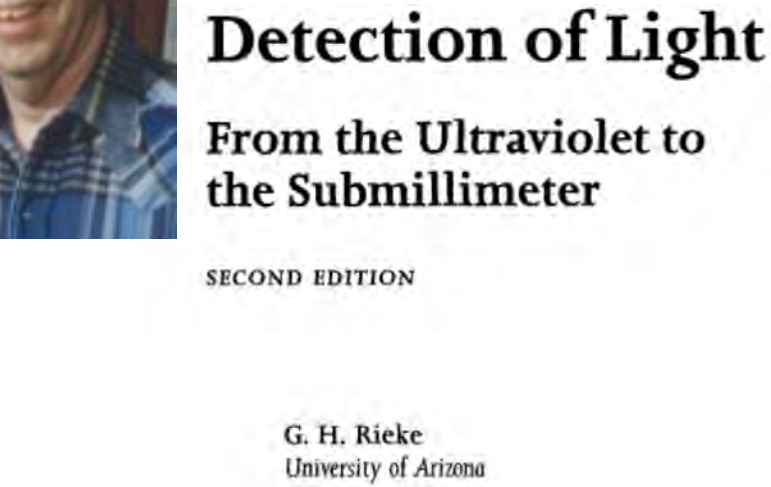
Klaus Hodapp

- Ph.D. 1984 MPIA & Univ. Heidelberg
- University of Hawaii since then
- Associate Director, Hilo Operations
- Characterization of NICMOS detectors for Hubble Space Telescope
- Development Lead of the Hawaii-1 and Hawaii-2 Detectors
- IR Instrument Development
  - ~ 12 Instruments at various telescopes
  - e.g., Hawaii, Gemini, Subaru, Wendelstein
- Science Interest
  - Star formation
  - Polarimetry in the IR
  - Protostars
  - Protoplanetary Disks
  - Outflows
  - Exoplanets



George Rieke

- Ph.D from Harvard University
- Deputy Director of the Univ. Arizona Steward Observatory, Tucson
- With Frank Low at University of Arizona, Tucson pioneering IR observing techniques ARA&A 2007, 45, 43[1]
- Contribution to IRAS: amplifier electronics
- Team Lead of MIPS (imaging photometer; 24, 70, and 160 μm) on Spitzer Space Telescope (2003)
- Science Team Lead of MIRI (imager & spectrometer 5 to 28.5 μm) on James Webb Space Telescope (2019)
- Three Books, several Awards
- Some of the Discoveries:
  - Ultraluminous infrared galaxies
  - Evolution of galactic nuclei is shaped by intense episodes of star formation
  - Massive stars have recently formed in the center of the Milky Way and they power this region
  - Saturn has a substantial internal energy source



[1]Annual Review of Astronomy & Astrophysics

607. Wilhelm and Else Heraeus-Seminar

Semiconductor detectors in astronomy, medicine, particle physics and photon science

14-17 February 2016
Physikzentrum Bad Honnef
Europe/Berlin timezone

Far-infrared detectors for ground and space based astronomy
H.-W. Hübers

History and current status of near-infrared detector arrays for astronomy
K.-W. Hodapp

JWST near- and mid-infrared detectors and instrumentation
G. Rieke

High performance, high resolution detector solutions for astronomy
P. McGrotty; Andor, Belfast; customized hardware applications