

# Rebondable Fan Ins

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**bmb+f** - Förderschwerpunkt

**ATLAS**

Großgeräte der physikalischen  
Grundlagenforschung

# Motivation



- During R&D phase many different flavours needed
  - Each flavour only needed few times
- too expensive to manufacture in industry (dominated by setup costs)

# Idea

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- Make flexible and easily adoptable approach
  - Automate layout process
  - Use AutoCAD macro language

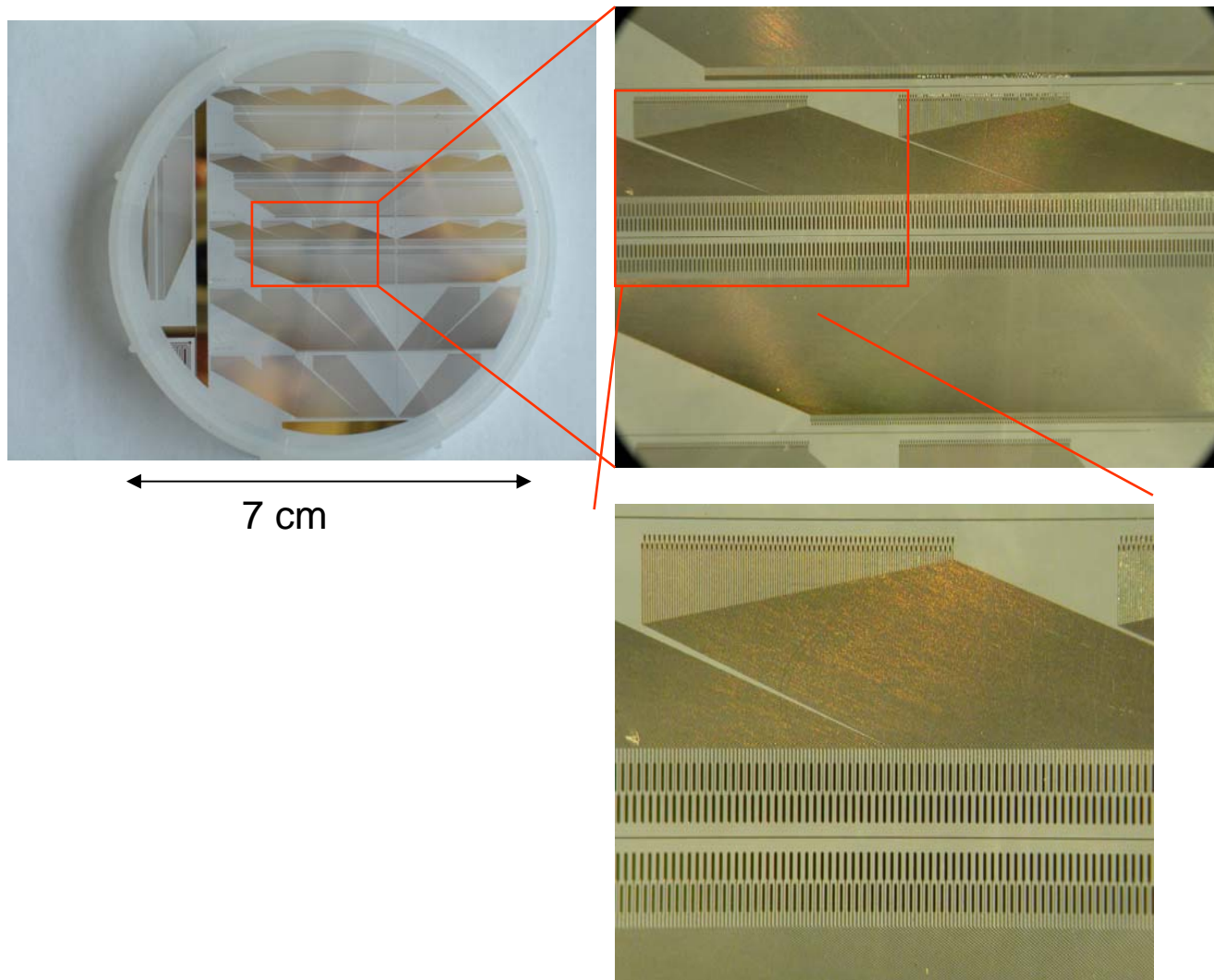
# Features

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- Automagically lays out fan in design for different:
  - Pitches
  - Bond pad separation
  - Number of bond pads
  - Rebondable and “normal” fan ins
  - Pad size (especially in trace direction for rebondability)
  - Relative position of pad rows

# First all-Au sample



# Production

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- Mask design in Freiburg
- Lithographic mask made in industry
- Fan in production „in house“ (Freiburg Materials research centre, A.Fauler)
- Metallisation is done through sputtering process
- Different metals available (2 in one go)
- Photolithographic lift off technique

# Materials I

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- Very first try on Alumina substrate ( $\text{Al}_2\text{O}_3$ )
  - problems with photo resist
  - impossible to see when photo resist is properly etched
  - very poor trace adhesion
- Changed to glass substrate (thanks to Miguel Ullán and CNM)
  - First results on glass look promising, see next slide

# Materials II



- Different metallisations possible
  - First try: Au traces (on thin Ti for adhesion)
    - Trace thickness: ~20nm Ti & ~330nm Au
    - Hard to bond at room temperature
    - Al-Au interface not stable („purple plague“)
    - High Z → long term activation during irradiation
  - Next try: Ni traces (without Ti adhesion layer)
    - Should have better bondability
    - Bond is made through ~50nm thin Au layer
    - Al-Ni interface stable
    - But also high Z
  - Future?: Al traces
    - Minimise Z as far as possible



# TODO



- Systematic bond tests
- Design a frame to clamp hybrid and detector part
  - Needs extremely stable alignment after bonding
  - Integrate cooling into frame
  - ...
- Assemble prototype modules...