

# PicoSec Kickoff Meeting Heidelberg Activities

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## Main HD Involvement:

WP3: Electronics & Data Acquisition  
WP4: Detector Integration & Prototyping

# Electronics & Data Acquisition (WP3)

HEP Calorimetry

## KLauS: Charge Readout Chip

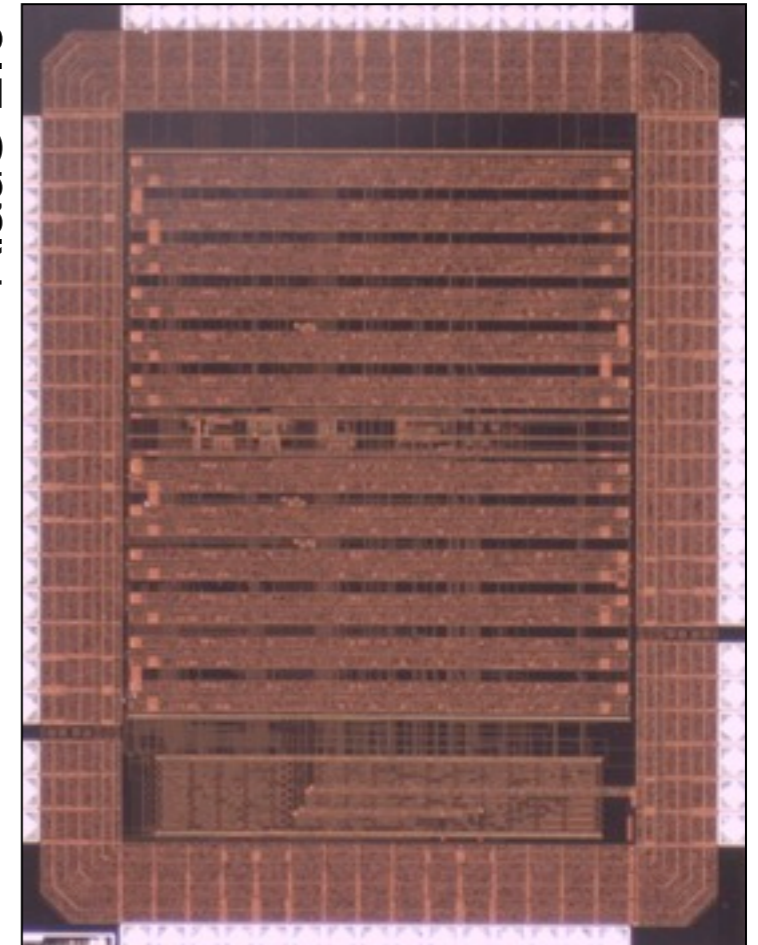
[Kanäle für Ladungsauslese von SiPMs]

AMS 350 nm CMOS technology  
SPI interface; tunable bias DAC  
High signal/noise ratio [ $>10$ , 40 fC signal charge];  
Fast trigger available [pixel signal jitter  $< 1$  ns];  
Large dynamic range up to 150pC

Klaus 2.0: Power pulsing; 12 channels ...  
First characterization done; functions as expected  
[Version 3: to be part of SPIROC III]

[S. Callier et. al, IEEE NSS/MIC, 2009; 0.1109/NSSMIC.2009.5401891]

Klaus 2.0



PET + ToF

## STiC: SiPM Timing Chip

[Fast Discrimination for ToF]

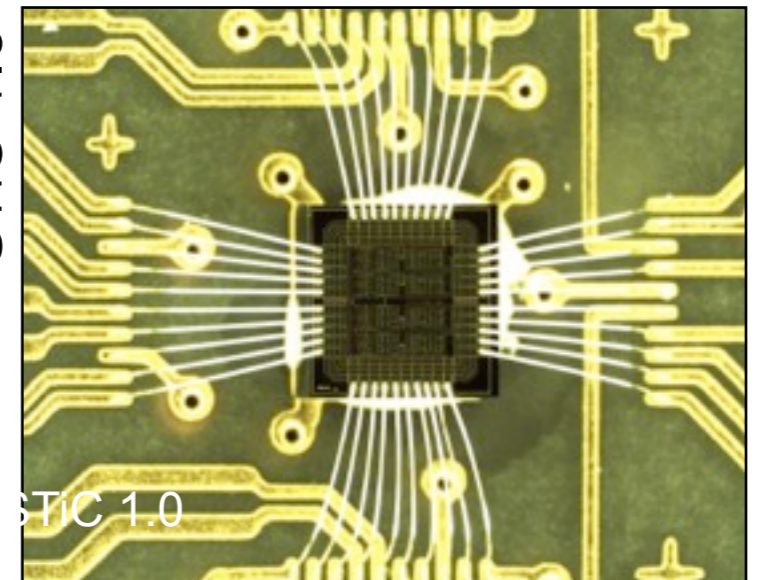
STiC 1.0: AMS 350 nm CMOS , 4 channels;  
Leading edge & Constant fraction trigger;  
Tunable bias DAC  $\sim 1$  V; power  $< 10$  mW/ch  
Pixel jitter  $\sim 300$  ps, time of flight capability

STiC 2.0: UMC 180 nm  
Differential design to explore timing limits ...  
Goal: Single pixel time resolution  $< 100$  ps.

[EndoToF PET-US project: STiC 2.0 + TDC ...]

W. Shen et. al, IEEE NSS/MIC, 2009; 10.1109/NSSMIC.2009.5401693

STiC 1.0



# Electronics & Data Acquisition (WP3)

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## STiC Version 2.0

[EndoTofPET US; external PET plate]

High precision timing measurement  
Leading edge trigger  
ToT energy measurement

Technology: UMC 180 nm  
16 channels; integrated TDC  
Full digital output

Review: June 20<sup>th</sup>

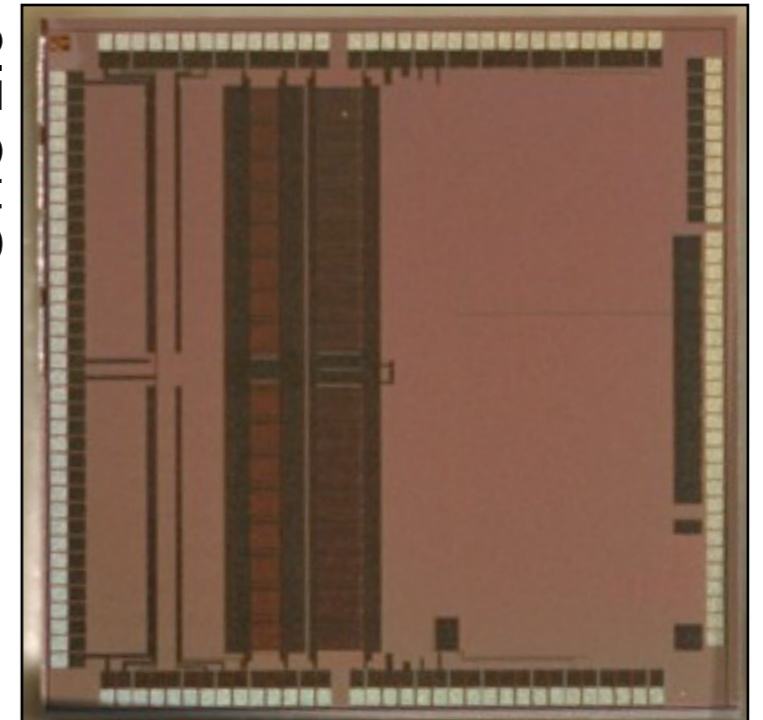
Submission: End of July

## STiC 2.0 Status:

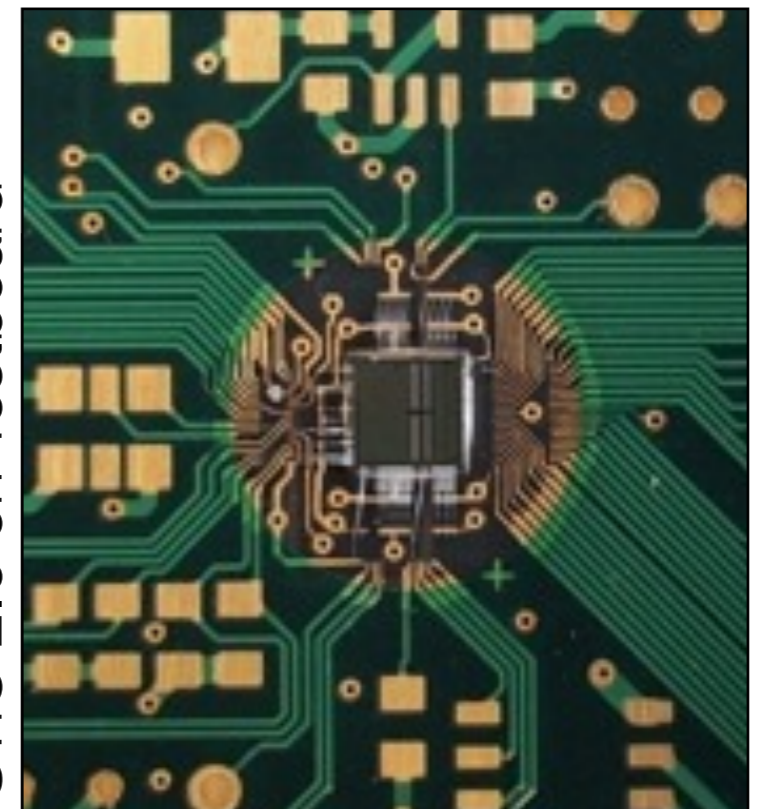
Chip and test board available ...

First tests performed last week  
Investigations ongoing ...

STiC 2.0



STiC 2.0 on Testboard



# Detector Integration & Prototyping (WP4)

## HD Activities:

- Simulation of Scintillator/SiPM-Systems
- Characterization of Scintillator/SiPM-Systems
- SiPM-Characterization
- EndoToFPET detector integration & prototyping  
[with DESY/Hamburg]

## Infrastructure:

- SiPM Test Laboratory
- Pulsed Laser System
- 2-arm PET-Prototype [@ DESY]

