Ni. Khera, F. Henningsen
for the IceCube Collaboration [†]
[†] http://icecube.wisc.edu/collaboration/authors/icrc21_icecube

SCAN ME

POCAM for the IceCube Upgrade

Instrument Housing

BK-7 glass
Diffuser
Ti flange
Aperture disk
Photosensors
Analog board
Digital board
Distribution board
IceCube interface

➲ **Housing:** Titanium with BK-7 glass hemispheres
➲ **Integrator:** Optical PTFE sphere
➲ **Self-monitoring:** Photodiode and SiPM
➲ **Flashing:** LED- and Laser drivers
▪ Intensity: $6e^7 - 1e^{11}$ photons / pulse
▪ Pulse width: 1.4 – 15ns
▪ Spectrum: 365, 405, 450, 465, 520nm

➲ **Electronics:** ▪ Analog-, digital- and distribution board for internal control
▪ Modular backend to adapt to telescope DAQ

LED driver #1
LED driver #2
λ_1 λ_5 λ_2 λ_4 λ_3
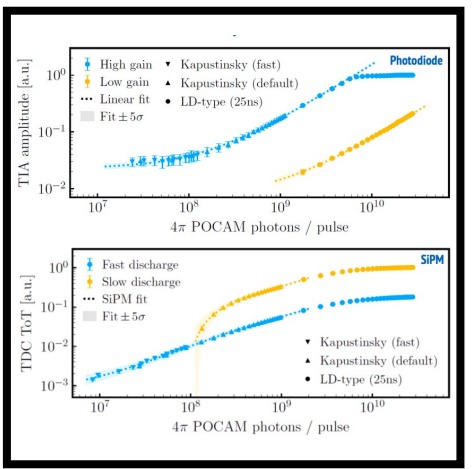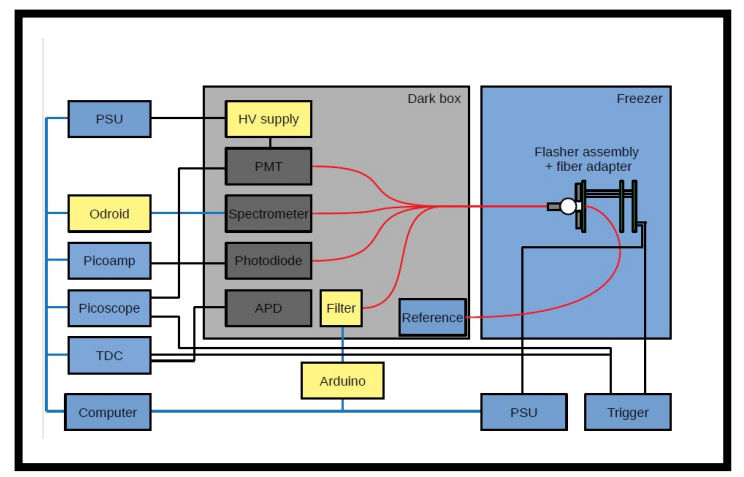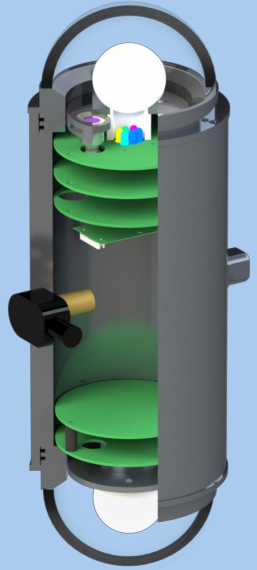LD driver #1
LD driver #2
LED   LD
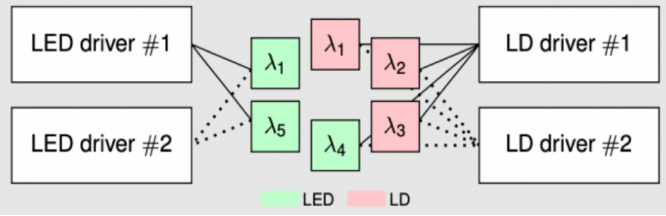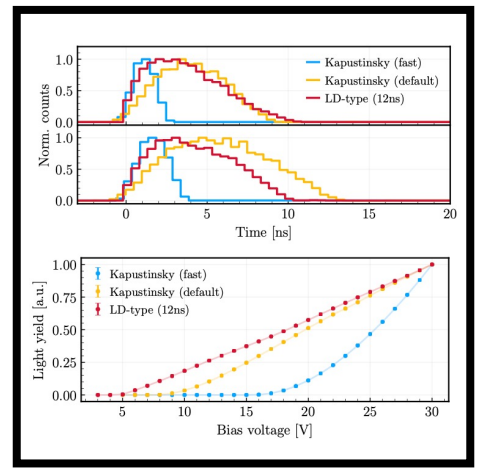
Flasher Performance

➲ 6 emitters - LEDs & LDs
➲ 2 drivers – Kapustinsky & LD-type
➲ Tests performed with 405nm LED
➲ Kap show later light onset that LD
➲ Characteristics also emitter dependent

Sensor Performance

➲ SiPM and PD integrated in the aperture disc
➲ In-situ pulse monitoring
➲ Correcting for intensity fluctuation
➲ Sipm - for low intensities, saturation seen otherwise
➲ PD – for high intensities

Ni. Khera, F. Henningsen
for the IceCube Collaboration [†]
[†] http://icecube.wisc.edu/collaboration/authors/icrc21_icecube

SCAN ME

ICRC 2021
ONLINE
THE ASTROPARTICLE PHYSICS CONFERENCE
Berlin | Germany
37th International
Cosmic Ray Conference
12–23 July 2021

Bundesministerium
für Bildung
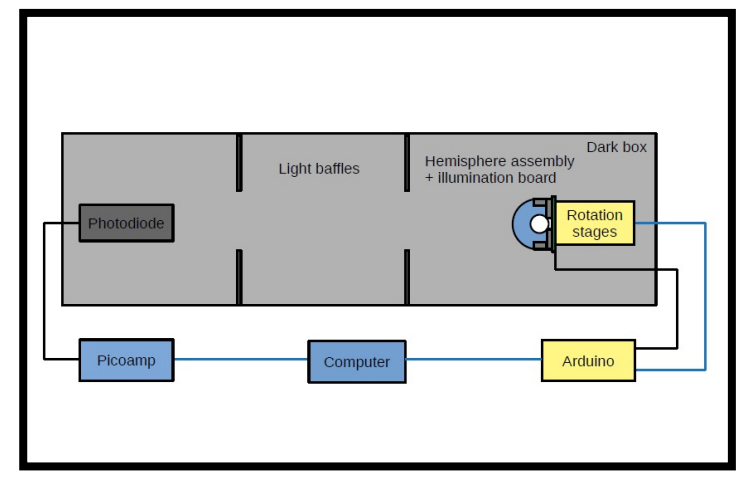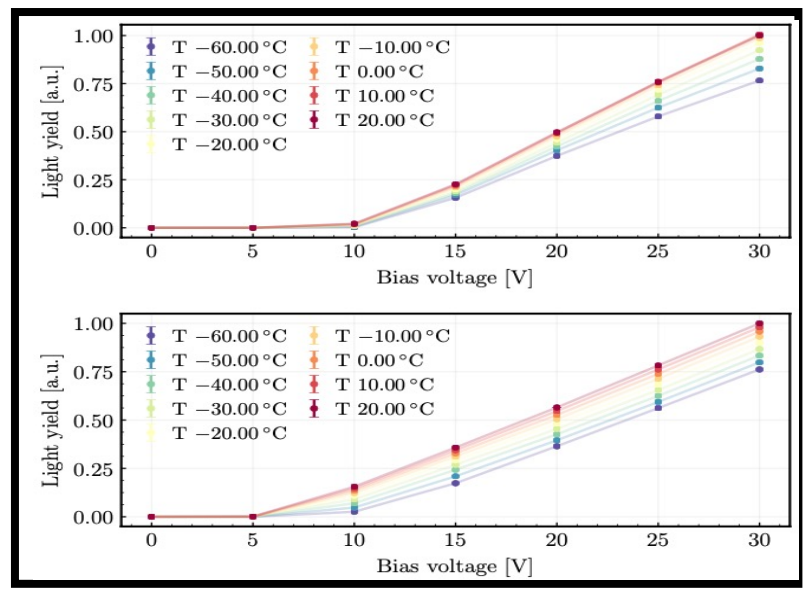und Forschung

POCAM for the IceCube Upgrade

Calibration Setups

Two dedicated setups:
- Left: Flasher characterization setup - flasher's relative intensity, time profile and spectrum variation.
- Right: Emission profile characterization setup - aims to characterize the emitted light pattern of each POCAM hemisphere relatively.

Dark box

PSU, HV supply, PMT, Spectrometer, Photodiode, APD, Filter, Reference, Odroid, Picoamp, Picoscope, TDC, Computer, Arduino

Freezer
Flasher assembly + fiber adapter
PSU, Trigger

Light baffles — Hemisphere assembly + illumination board — Dark box
Photodiode, Rotation stages, Picoamp, Computer, Arduino

Calibration - Data

- Left: Temperature dependence of the pulser intensity as a function of bias voltage.
- Right: emission profile in Mollweide projection for a single hemisphere and a virtual complete POCAM .