

WORKSHOP ON
PHOTODETECTORS FOR ASTRO-
PARTICLE PHYSICS

WELCOME

THE GENESIS OF THIS WORKSHOP: DAYDREAMING BY BIKE

Sensing the ~~Photonic~~ *Extend in future?*
Imprints of Neutrinos and
X-particle (SPHIX)
SPHIX - WORKSHOP



COMPELLING SUITE OF EXPERIMENTS SENSING LIGHT

- ▶ Water Cerenkov: SuperK, HyperK, NuPRISM, Ocean Network, IceCUBE
 - ▶ Neutrino oscillation, supernova, astronomy
- ▶ Liquid scintillators: SNO+ (JUNO, KAMLAND,...)
 - ▶ Neutrino oscillation, 0ν double beta decay
- ▶ Liquid Argon: DEAP-3600, DarkSide-20k, SBC
 - ▶ Dark matter search
- ▶ Liquid Xenon: nEXO, (LZ, XENONnT)
 - ▶ 0ν double beta decay, dark matter search

EXCITING TECHNOLOGY DEVELOPMENT

- ▶ Photo-multiplier tube, the workhorse
 - ▶ Cons: fragile, bulky, expensive, sensitive to magnetic field, gain fluctuations, and not cool?
 - ▶ The future: Digital hybrid photo-detector -> cheaper, easier to scale
- ▶ Silicon photo-multiplier, the fashionable
 - ▶ Cons: dark noise, pulse shape/capacitance
 - ▶ The future: digital -> low power, imaging, timing
- ▶ Optics (photon transport), the lost child
 - ▶ Reflector, light concentrator, wavelength shifter,...

BEYOND ASTROPARTICLE PHYSICS

- ▶ Can we develop detectors solely for basic research nowadays?
- ▶ In a changing world, shouldn't we more than ever translate technology for healthier humans and a healthier planet?



SORRY FOR THE LAST MINUTE
ORGANIZATION OF THIS
WORKSHOP

LET'S GET
STARTED