



LGAD Discussion session



- C enrichment mastered to the level that sensors can survive 2.5e15 cm⁻² (HL-LHC) timing was mastered by FBK/IME (IHEP,USTC) it looks like c~1e-16 cm2 is the "natural limit"
- Half-activated-Boron approach of HPK is currently investigated (first tests at INFN-TO and JSI) an improvement has been seen, but not to the same level as with carbon.
- Compensated LGADs (INFN-TO) may be a solution, but this requires good knowledge and control of B and P removal and super fine tune. HPK tested their devices utilizing compensation and the outcome was not promising actually very little difference to reference LGADs. This approach is also AIDAINNOVA blue sky project.
- >Understanding the origin of the damage
 - Can we invent some other impurity that would reduce the removal constant even further? Replace the B with something else? Ga has failed, but not understood so well supprisingly similar removal as for B?
 - > Understanding the acceptor removal on microscopic level:
 - > BiOi
 - > Bi role in the silicon various defects it can form.
 - $> g_{Bi} g_{BiOi} = ?$

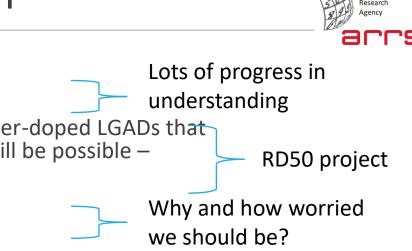
RD50 project

RD50 project

Val's ERC



LGADs – points for discussion



>Understanding the operation

>screening effects (angled tracks, irradiated sensors, current gain)

Impact ionization at very high fluences (preparation of the RD50 project on super-doped LGADs that would only work at very high fluences – and probing of the impact ionization will be possible – collecting the interest – is use of multiplication possible at extreme fluences?)

cp/cn ratio for different charged hadrons

Improvement of inter-pad distance (progressing fast on many fronts) TI-LGADs, iLGADs, DJ-LGADs, AC-LGAD, DC-RSD

> Detection of non-mip particles for use in medicine, nuclear physics, X-ray.

We should start implementing the LGADs in simulations/digitization/operation scenarios for the HL-LHC experiments!

- >more complicated than strips/pixels
- role of annealing in running scenarios
- >tools/ideas to monitor and understand the performance during operation

Marriage of CMOS and LGADs....

JSI ubliana

lovenia