

Exploiting the distributed signal in Resistive Silicon Detectors (RSD, AC-LGAD) to achieve micron-level spatial resolution

Thursday, May 27, 2021 10:06 AM (18 minutes)

Resistive Silicon Detectors (RSD, also known as AC-LGAD) are novel n-in-p silicon sensors, based on the LGAD technology, featuring an unsegmented gain layer that spreads over the whole sensor active area. The innovative feature of the RSD design is that the signal produced by an ionizing particle is seen on several pixels, allowing the use of Machine Learning techniques that exploit the information of many read-out channels to predict the particle impact position with great accuracy. For instance, the spatial resolution of an RSD with 100 μm pixels is measured to be less than 2 μm .

I will discuss the key aspects of the RSD design and present results on the position resolution of sensors with different geometries, obtained with a precise laser setup. I will also describe the development and training of the Machine Learning algorithm used to reconstruct the impact positions. All tested sensors come from the first RSD production (RSD1) produced at Fondazione Bruno Kessler (FBK, Italy).

TIPP2020 abstract resubmission?

No, this is an entirely new submission.

Funding information

Primary author: SIVIERO, Federico (Universita e INFN Torino (IT))

Co-authors: ARCIDIACONO, Roberta (Universita e INFN Torino (IT)); CARTIGLIA, Nicolo (INFN Torino (IT)); COSTA, marco (University of Torino); TORNAGO, Marta; FERRERO, Marco (Universita e INFN Torino (IT)); SOLA, Valentina (Universita e INFN Torino (IT)); MANDURRINO, Marco (INFN); LEGGER, Federica (Universita e INFN Torino (IT)); STALANO, Amedeo (Universita e INFN Torino (IT))

Presenter: SIVIERO, Federico (Universita e INFN Torino (IT))

Session Classification: Sensors: Solid-state sensors for tracking

Track Classification: Sensors: Sensors: Solid-state position sensors