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Problems in the Appearance of SiPMs: A Brief History and Perspectives

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A brief history on the development of the micropixel avalanche photodiodes – MAPDs (or silicon photomultipliers SiPMs) is presented since the 80s years of the last century. It is shown that the main problem in creation of APDs with high gain was appearance the local uncontrolled breakdowns in the p-n junctions. The following topics concerning the stages of developments of the modern SiPMs are discussed:

- Two different approaches in development of APDs: improvement of technology and search for new designs to avoid the local breakdowns.
- Differences in performance of traditional SPAD devices and MAPDs.
- A long way from APD to MAPDs via the avalanche MIS and MRS structures.
- Three advanced designs of MAPDs.
- A new avalanche detector – micropixel avalanche phototransistor.

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