Controlled shallow single-ion implantation in silicon using an active substrate for sub-20-keV ions

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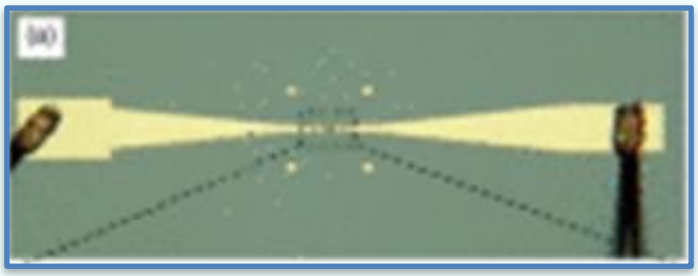
Applied Physics Letters 86, 202101 (2005)



Optical image of the active region of the single donor in silicon device.

We demonstrate a method for the controlled implantation of single ions into a silicon substrate with energy of sub-20- keV The method is based on the collection of electron-hole pairs generated in the substrate by the impact of a single ion. We have used the method to implant single 14- keV P31 ions through nanoscale masks into silicon as a route to the fabrication of devices based on single donors in silicon.

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