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## Highly sensitive detectors for the B-BOP instrument

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B-BOP is one of the three scientific instruments of SPICA which aims, among other scientific goals, to map the galactic filamentary structures and their associated magnetic fields.

Each pixel of B-BOP consists of two orthogonal arrays of dipole antennas supported by four suspended interlaced spirals based on Si:P, B. In order to have a deep understanding of the influence of the doping densities on the Si thermometer's electrical behavior, we have experimentally investigated, over a wide range of temperatures and with different doping densities, several square Si:P, B samples. The obtained results showed nonlinear R(PJoule) behavior which can be described by the variable-range hopping model. In addition, numerical simulations based on the experimental results, have been carried out to study the thermoelectric behaviour of each pixel as a function of the bias current,  $I_{\text{bias}}$ , and the absorbed optical power,  $P_{\text{Opt}}$ . We demonstrated (i) a strong dependence of the detector response,  $S = dV/dP$ , with  $I_{\text{bias}}$  over a five order of optical power magnitude, (ii) a gain of more than two orders of magnitude in sensitivity over Herschel space observatory, and (iii) a thermal time constant around 70 ms.

### Less than 5 years of experience since completion of Ph.D

Y

### Student (Ph.D., M.Sc. or B.Sc.)

N

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