

Proton beam writing

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The ability of MeV ions to penetrate deep into matter with little deviation from their initial paths, has led to a new type of direct-write lithographic process capable of 3D micromachining in resist materials [1]. The theory underlying proton beam writing will be discussed, including one of its most important characteristics, that of minimal proximity effects (ie unwanted exposure due to secondary electrons). The latest state-of-the-art performances will be also described [2], and finally some applications in the fields of photonics, lab-on-a-chip technology, and silicon structuring.

[1] Watt, F., Breese, M.B.H., Bettiol, A.A., van Kan, J.A. Proton beam writing. *Materials Today*, 10 (6), pp. 20-29 (2007)

[2] J. A. van Kan, P. Malar, and Armin Baysic de Vera: The second generation Singapore high resolution proton beam writing facility; *REVIEW OF SCIENTIFIC INSTRUMENTS* **83**, 02B902 (2012)