

# Calculation of corrected BPM data with polynomials obtained from BpmLab: ESRF and ALBA showcases

*Tuesday 4 June 2019 15:20 (25 minutes)*

BpmLab is a 2D finite element-based tool for Matlab developed at ALBA and aimed at simulating the electrode response of BPMs of arbitrary geometry to emulated beam excitation. Lately, BpmLab has been thoroughly adapted to EBS BPM geometries to analyze the nonlinear effects and the remedies around them. More complicated situations have as well been studied, e.g. imperfect positioned BPM-buttons. Finally the 2-dimensional geometry-dependent polynomials were calculated to strongly minimize errors and coupling effects that are usually produced by the traditional Delta-over-Sum algorithms for beam position, sum signal and the incoherence (Q) values. Apart from the fast-data streams, all data & buffers of the new EBS will be calculated with such polynomial families, selectable inside the device server of the (Liberia and Spark) BPM electronics. Specific beam tests were performed both in ESRF and ALBA to achieve high orbit offsets and study the effects of polynomials on the BPM data to better understand their efficiency.

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**Track Classification:** BPM error compensation schemes