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AC excitation studies for full coupling operation

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Betatron coupling resonance has been considered by many low emittance upgrade light sources as a candidate to produce round beams. Due to the limited literature on the topic, last year an experimental campaign was undertaken on the ALBA storage ring to establish limits and requirements to operate a light source in full coupling. The work highlighted how coupling can indeed produce a round beam with certain easiness but not free from shortcomings: the fractional betatron tunes must be set equal, resulting in a substantial constraint to the optics and requiring a sophisticated control of the optics itself in order to keep the resonance condition despite the movement of insertion devices and drifts.

To work around these limitations, this year a different approach, based on the excitation of the coupling resonance with an A.C. skew quadrupole was tested. A first experiment was attempted by converting the existing tune excitation stripline into a skew quadrupole, but the limited available power allowed to produce only a barely perceptible coupling. The stripline was then turned into an electric deflector by removing the resistive terminations and allowing to drive the electrodes to higher voltage. Here the newly obtained results with the A.C excitation are presented.

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Footnotes

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Yes

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