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Pulse defect immune Ramsey spectroscopy CHRISTIAN SANNER, NILS HUNTEMANN, SERGEY KUZNETSOV, BURGHARD LIPPHARDT, CHRISTIAN TAMM, EKKEHARD PEIK, PTB — We show that a balanced version of Ramsey's method of separated oscillatory fields is well suited for measuring unperturbed transition frequencies of atomic reference transitions that suffer from significant clock shifts in the presence of the oscillatory drive fields. Using the example of the strongly light shift affected Yb171+ octupole transition [1] we experimentally demonstrate the feasibility of this concept and show that no systematic clock shifts are incurred for arbitrarily detuned drive pulses. Unlike composite pulse approaches as proposed in [2] balanced Ramsey spectroscopy can provide universal immunity to a variety of pulse aberrations and drive pulse induced shifts including phase chirps and pulse-synchronous intensity variations. In this context we also devise an experimental method addressing issues related to motional heating of the confined ion. Furthermore we report on the status of an Yb+ experiment searching for signatures of spatial anisotropy. [1] PRL 108, 090801 (2012), [2] PRA 82, 011804 (2010)

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