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A TWT upgrade to study wave-particle interactions in plasma¹ FABRICE DOVEIL, CNRS (FR), MEIRIELEN CAETANO DE SOUSA, universidade de Sao Paulo (BR), DIDIER GUYOMARC'H, CNRS (FR), AISSA KAHLI, YVES ELSKENS, Aix-Marseille universite (FR) — Beside industrial applications, Traveling Wave Tubes (TWT) are useful to mimic and study wave-particle interaction in plasma [1-3]. We upgraded a TWT, whose slow wave structure is a 4 m long helix (diameter 3.4 cm, pitch 1 mm) of Be-Cu wire (diameter 0.6 mm) wrapped in insulating tape. The helix is inserted in a vacuum glass tube. At one end, an electron gun produces a beam propagating along the helix, radially confined by a constant axial magnetic field. Movable probes, capacitively coupled to the helix through the glass tube, launch and monitor waves generated by an arbitrary waveform generator at a few tens of MHz. At the other end of the helix, a trochoidal analyzer allows to reconstruct the electron distribution functions of the beam after its self-consistent interaction with the waves. Linear properties of the new device will be reported. The measured coupling coefficients of each probe with the helix are used to reconstruct the growth and saturation of a launched wave as it interacts with the electron beam.

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