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Lyman-alpha source for spectroscopy and laser cooling of antihydrogen

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Hydrogen Lyman-α radiation (121.56 nm) is important because it allows for the excitation and detection of ground-state antihydrogen atoms by a one-photon process. The trapping of antihydrogen, recently reported by the ALPHA collaboration at CERN, has revived interest in Lyman-α lasers. In order to perform high precision tests of matter-antimatter symmetry violations or gravity-antimatter interactions with antihydrogen, laser cooling using the 1s-2p single photon transition is essential. We describe the implementation of a high power vacuum-ultraviolet (VUV) laser at the Lyman-α transition of antihydrogen.

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