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**Efficient Backward Emission from Optically Pumped Air** ANDREW TRAVERSO, RODRIGO SANCHEZ-GONZALEZ, MICHAEL GRUBB, DMITRI VORONINE, KAI WANG, LUQI YUAN, Texas A&M University, ALEXEI ZHELTIKOV, Texas A&M University/Moscow State University, ARTHUR DOGARIU, JAMES MICHAEL, RICHARD MILES, Princeton University, VLADIMIR SAUTENKOV, ALEXEI SOKOLOV, SIMON NORTH, Texas A&M University, MARLAN SCULLY, Texas A&M University/Princeton University — We demonstrate the generation of backwards emitted coherent light in atmosphere via optical pumping. The backwards emitted light is narrow band centered at 845 nm and is generated from the dissociation of molecular oxygen and then subsequent two photon excitation of these newly dissociated oxygen atoms. Both the dissociation and excitation of oxygen are driven by a single 226 nm ∼10 nanosecond pulsed pump beam. The produced 845 nm light is a pulse approximately 10 nanosecond in duration and not only exhibits threshold characteristics, but is also nearly diffraction-limited. This optically-pumped mirror-less light source which propagates back towards the pump source presents a unique opportunity to develop new techniques for remote sensing.

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