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### ► To cite this version:

Yijun Yang, Christian Lafforgue, Quentin Wilmart, Thibaut Sylvestre, Sylvain Guerber, et al.. Supercontinuum generation in 800nm thick ultra-low loss silicon nitride waveguides. SPIE Photonics West - Smart Photonic and Optoelectronic Integrated Circuits, Jan 2023, San Francisco, California, United States. pp.PC1242502, 10.1117/12.2657444 . hal-04260102

**HAL Id: hal-04260102**

**<https://hal.science/hal-04260102v1>**

Submitted on 26 Oct 2023

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# Supercontinuum generation in a 800nm thick ultra-low loss silicon nitride waveguide

Yijun Yang<sup>1,\*</sup>, Christian Lafforgue<sup>1</sup>, Quentin Wilmart<sup>2</sup>, Thibaut Sylvestre<sup>3</sup>, Sylvain Guerber<sup>2</sup>, Xavier Le Roux<sup>1</sup>, Eric Cassan<sup>1</sup>, Delphine Marris-Morini<sup>1</sup>, Carlos Alonso-Ramos<sup>1</sup>, Bertrand Szlag<sup>2</sup> and Laurent Vivien<sup>1</sup>

<sup>1</sup> Université Paris-Saclay, CNRS, Centre de Nanosciences et de Nanotechnologies (C2N), 91120 Palaiseau, France

<sup>2</sup> Univ. Grenoble Alpes, CEA, LETI, Grenoble, 38000, France

<sup>3</sup> Institut FEMTO-ST, Université Bourgogne Franche-Comté CNRS UMR 6174, 25000, Besançon, France

\* yijun.yang@c2n.upsaclay.fr

## INTRODUCTION

Nonlinear optics has paved the way for many integrated photonics applications including optical communications, sensing, and quantum technology. Among nonlinear effects, supercontinuum generation (SCG) is a key effect in broadening the spectrum of laser pulses over one or more octaves. SCG is therefore essential for applications such as f-2f interferometry [1], optical coherence tomography (OCT), and spectroscopy [2]. Among integrated photonics platforms, SiN waveguides are currently widely used for their good compatibility with the silicon platform, their high nonlinearity, and their low linear loss. Moreover, SiN has a negligible nonlinear loss in both the visible and near IR ranges.

Here we report SCG over 1.3 octave by pumping with femtosecond pulses at 1550 nm dispersion-engineered ultra-low-loss silicon nitride (SiN) integrated waveguides. Our SiN waveguides were fabricated by CEA LETI using a wafer-scale process to achieve loss as low as a few (specify how much ? 3 dB/m ?) dB/m [3]. Such low loss can compete with the performances obtained with the Damascene process [4]. SiN waveguides were designed with a 800 nm thickness to get a weak anomalous dispersion at 1550 nm. Pumping this SiN waveguide at 1550 nm we obtained a relatively symmetric SC spectrum from ? nm to ? nm, through the combined effects of higher-order soliton compression and dispersive wave generation [5].

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