Introduction to the Feature Issue on Recent Advances in Lithium Niobate Optical Technology

THE functionality of waveguide and bulk $LiNbO_3$ optical devices has increased dramatically over the past few years. Recent advances in the technologies of rare-earth doping and domain engineering in this material have demonstrated the potential for commercially attractive lasers and nonlinear optical sources which are compact, efficient, inexpensive, and manufacturable. These devices could find use in a wide range of applications including telecommunications, range finding, military counter measures, optical data storage, remote sensing, and reproduction graphics. Although there have been many excellent papers highlighting research into these various applications, the aim of the invited collection given here is to present work which illustrates the transition from research to potential commercialization. Readers are encouraged to explore the many references to related work cited in these papers. Highlights of the invited collection include the following.

- Diffusion-doped Er:$LiNbO_3$ waveguide laser sources that are packaged, pigtailed, and compatible with fiber systems. This includes tunable lasers for WDM applications and pulsed lasers for soliton sources.
- Bulk-doped Nd: and Er:$LiNbO_3$ waveguide lasers illustrating active mode-locking and Q-switching.
- Numerical modeling of Q-switched Er-doped waveguide lasers which may assist in the design of eye-safe range-finding systems
- Domain-engineered second harmonic generating sources in bulk and waveguide geometries for visible light generation with emphasis on stability of pump sources and packaging.
- Domain-engineered optical parametric oscillators fabricated in bulk $LiNbO_3$ that operate in the 3–4-μm range with greater than 3 W of CW output power.

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