



Press release

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Bookham Technology to announce record-breaking performance from novel 40Gbit/s electro-absorption modulator design at OFC 2003

Ottawa, Canada — Bookham Technology plc (LSE: BHM, Nasdaq: BKHM) will present a paper at the Optical Fiber Communication Conference and Exposition in March 2003 that describes a novel 40Gbit/s electro-absorption modulator (EAM) module with unequalled performance. Based on the Franz–Keldysh effect (FKE), the EAM device has the lowest unamplified insertion loss ever reported for an EAM, the lowest polarisation-dependent loss (PDL) over a wide range of wavelengths, and the highest bandwidth for a lumped-element FKE-EAM. All these performance parameters are achieved simultaneously, with a manufacturable design, while maintaining the practical requirement of over 10dB extinction with a voltage swing of under 2.5V.

“This modulator emphasises Bookham’s forward-looking commitment to realise and evaluate the potential of advanced optical technologies for our customers,” says Kelvin Prosyk, Senior Researcher, Bookham Technology and joint author of the OFC paper describing the device. “We now have the technology to build the world’s best EAM for high-speed systems — and this is a complete, single package integrating all the necessary 40Gbit/s RF functions, which is a hard problem. Given that Bookham already has the world-leading 10Gbit/s InP Mach–Zehnder modulator, this gives us a unique understanding of the respective potentials of the two approaches to high-speed modulators. Certainly, there is nothing between them in terms of size, but the InP laser Mach–Zehnder continues to outclass the EAM in 10 Gbit/s system performance.”

The InP-based EAM device has a bulk active absorption core, which is inherently simple to fabricate and consequently gives high yields. This design also gives the near-zero chirp needed for the dispersion compensation of 40Gbit/s operation on standard single-mode-fibre links with spans of over about 8km. This attribute is relevant to other applications of high-speed EAMs, such as the data gating of a train of pulses. In this case, some pulse clipping will occur with anything other than an ideal square gate, thus making low chirp a necessity.

Integrated spot-size converters (SSCs), also used in Bookham’s InP laser Mach–Zehnder modulators, are a key aspect of the design, as they enable tight device integration and small package size by improving the laser–modulator optical coupling and consequently power throughput. The SSCs are designed to enable low loss, low PDL and good alignment tolerance when coupled to microlenses. The EAM chip is mounted on a ceramic, gold-coated subcarrier with a 50Ω coplanar termination. The subcarrier, in turn, rests on a thermo-electric cooler with a thermistor temperature monitor. Standard single-mode fibre (SMF) pigtails are lens coupled to the input and output SSCs of the EAM.

The resulting EAM device has a usable bandwidth of 50GHz. At 1540nm, the fibre-to-fibre insertion loss is 4dB while maintaining an extinction ratio of >10dB at 2.5V. At 1550nm, the insertion loss falls to 3.6dB, which is the lowest so far reported for an EAM. The polarisation-dependent loss (PDL) is less than 0.3dB over the entire dynamic range at 1540nm, and less than 0.6dB from 1530 to 1550nm, which is the lowest PDL ever reported for an EAM over a wide wavelength range.

Notes for editors

(1) The Optical Fiber Communication Conference and Exposition (OFC) is one of the major events for the fibre-optics industry. OFC 2003 will be held in Atlanta, Georgia, USA, 23 – 28 March 2003. Details are available at www.ofconference.com.

(2) The paper *Record unamplified loss 40GHz electro-absorption modulator module* by K.Prosyk, R.Moore, I.Betty, R.Foster, J.Greenspan, P.Singh, S.O'Keefe, J.Oosterom, P.Langlois, will appear in the OFC 2003 Conference Proceedings.

(3) The Franz–Keldysh effect (FKE) is the change in optical absorption that occurs when an electric field is applied to a direct bandgap semiconductor. FKE modulators thus use a changing electric field to modulate the optical power transmitted through the semiconductor.

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Bookham Technology (LSE: BHM; NASDAQ: BKHM) designs, manufactures and markets optical components and subsystems using high volume production methods. With three cost disruptive technologies: Gallium Arsenide (GaAs) for modulation; Indium Phosphide (InP) for tunability and the silicon-based ASOC integration platform, the company delivers end-to-end solutions to communication network system providers, that offer higher performance, lower cost and provide greater subsystems capability to meet their customers' needs. The company's components and subsystems are used in access, metropolitan and long-haul networks. In November 2002, Bookham acquired the optical components businesses from Nortel Networks. This followed the acquisition of Marconi's optical components business in February 2002. The company, whose securities are traded on NASDAQ and the London Stock Exchange, is headquartered in the UK, with manufacturing facilities in the UK, Canada, and Switzerland with offices in US, France, Italy and Japan, and employs approximately 2000 people worldwide.

More information on Bookham Technology is available at www.bookham.com
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