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# Chromatic dispersion compensation for VCSEL transmission for applications such as Square Kilometre Array South Africa

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### Abstract content <br> &nbsp; (Max 300 words)

In addition to attenuation, optical fibre transmission suffers significant penalty from dispersion related effects. We theoretically and experimentally investigate the compensation of chromatic dispersion of 4.25 Gbps 1550 nm vertical cavity surface emitting laser (VCSEL) transmission using inverse dispersion fibre. Simulated results show that inverse dispersion fibre can compensate up to 3.7 dB on a 35 km ITU-T G.652 fibre. The residual dispersion penalties are small, thus effective compensation is achieved. In an experimental demonstration, a 25 km low water peak (LWP) fibre with a low negative dispersion value was found to improve the signal clarity when combined with a G.652 fibre. Inverse dispersion fibres cancel the cumulated dispersion in transmitting fibres, hence improving the VCSEL transmission significantly. This is a cost effective and simple chromatic dispersion mitigation technique, suitable for Square Kilometre Array application as the transmission distances increase at different construction phases.

Key words: VCSEL, Chromatic dispersion, compensation, Square Kilometre Array

## Apply to be<br> considered for a student <br> &nbsp; award (Yes / No)?

Yes

### Level for award<br>&nbsp;(Hons, MSc, <br> &nbsp; PhD)?

PhD

#### Main supervisor (name and email)<br>and his / her institution

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## Would you like to <br>> submit a short paper <br>> for the Conference <br>> Proceedings (Yes / No)?

Yes

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