

World's longest laser invented

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Academics at Aston University in Birmingham, UK have invented what is thought to be the world's longest [laser](#). They have transformed an optical fibre 75 kilometres long into the laser, which the team hopes will improve long distance transmissions across the World.

The new laser is special because it can transmit light signals over such a long distance without any loss of power, so the signal that is being sent barely deteriorates. When normal telephone conversations or data sent over the internet are converted to light in order to travel through standard optical fibres the signals lose around 5 per cent of their power for every kilometre that they travel. The signals then have to be amplified to ensure that they reach their destination. But any time the signals get amplified, the background noise gets amplified too, until it gets so high the signals cannot be understood anymore.

Now Dr Juan Diego Ania Castañón and his colleagues at Aston

University have used a special process called the Raman effect (a natural phenomenon that affects light passing through a material) to transform a long optical fibre into an ultra-long laser. Lasers inject light at each end, which makes some of the fibre's atoms give out more energy and emit photons (particles of light) of a longer wavelength. These photons are reflected back into the fibre by special mirrors at each end of the optical link. The fibre then stores a stable, uniform amount of laser light that travels with the signals and strengthens them, enabling them to move across the fibre at full power without suffering any loss, so removing the need to amplify the signals.

The discovery is tremendously exciting, not only in the world of science, but in the world of telecommunications.

Dr. Ania-Castañón explains: 'Lossless transmission of data has always been a dream goal in the world of communications. The development of a simple method to implement nearly ideal links between receiver and sender paves the way to important advances in long-distance telecommunications and opens exciting possibilities for research in other fields.'

Source: Aston University

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