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Quantum Begins at School: The Einstein-First project

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Einstein-First is an Australian initiative with a decade-long history. Its mission is to modernise school science curricula by embedding Einsteinian physics—relativity, quantum mechanics, and their technological applications—into core science education. The revolutionary physics of the 20th century is almost entirely absent from schools, reserved for the small minority who study physics in Years 11–12. As a result, most students complete school without exposure to the ideas underpinning contemporary science, technology, and innovation.

The project offers a coherent sequence that introduces modern physics from Year 3 onwards. Quantum concepts appear early, with uncertainty and interference introduced in Year 5 and revisited in Year 9, ensuring age-appropriate progression. Key topics include quantum probability, spin, wave–particle duality, and non-locality, supported by hands-on activities. These link directly to applications such as quantum computing, medical imaging, spin-based astronomy, and gravitational wave detection, helping students grasp both the concepts and their relevance to modern technologies.

Over more than a decade of research, development, and classroom trials, Einstein-First has shown that students from Year 3 can meaningfully engage with Einsteinian concepts when supported by suitable models, activities, and mathematical tools. The same resources, delivered through structured micro-credential courses, enable teachers without prior science training to gain the confidence to teach programs up to Year 10. Professional development guides teachers through a progression from informal reasoning to formal understanding.

By embedding Einsteinian physics into the mainstream curriculum, Einstein-First aligns school science with the foundations of modern knowledge and prepares Australian students for the quantum technologies of the 21st century. This work highlights Australia's leadership in science education reform and its contribution to the International Year of Quantum Science and Technology.

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