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First light : from the ruby laser to nonlinear optics

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Laser action was first demonstrated by Maiman in a flashlamp-pumped ruby crystal in May of 1960. This talk, based in part on personal recollections, recounts some of the research highlights during the two years that followed - a period of exponential growth in the field of quantum electronics, driven by the newly available, unprecedented coherence, power, and monochomaticity of laser light. Active areas from the beginning were new lasers in HeNe and other gas systems, in host crystals with increasingly effective dopants, and in glass. Modes in open resonators became understood, as did the surprising granularity of laser light An important step was the Q-switch, enabling megawatt lasers and providing a new tool for the study of dielectrics at high optical fields. The field of nonlinear optics opened up with experimental discoveries including optical second harmonic generation, two-photon absorption, phase matching and stimulated Raman scattering. A key to subsequent progress was a comprehensive quantum mechanical theory that provided a general description of nonlinear optical processes. The end of the two-year period covered here coincided with two advances which were to shape the future role of lasers in technology and science: the first semiconductor lasers; and a theoretical description of states of light having truly quantum properties, properties not evident in laser light up to that time.