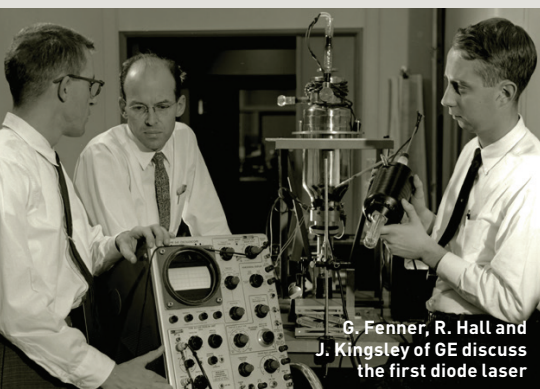
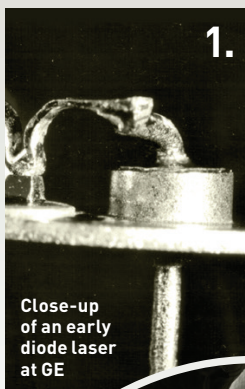


Race to the Diode Laser

On 9 July 1962, at the Solid State Device Research Conference in Durham, NH, USA, Robert J. Keyes of MIT Lincoln Laboratory reported observing intense luminescence with a quantum efficiency of ~85 % from GaAs junctions at 77 K. Within months, four research teams would independently develop and demonstrate injection lasers. For a look at diode lasers today, see this month's cover story (p. 28).



G. Fenner, R. Hall and J. Kingsley of GE discuss the first diode laser



Close-up of an early diode laser at GE



G. Lasher, W.P. Dumke, G. Burns, M.I. Nathan and F.H. Dill Jr. of IBM with a diode laser

28 September 1962: Marshall I. Nathan and Gordon Lasher at IBM Watson Research Lab demonstrate stimulated emission

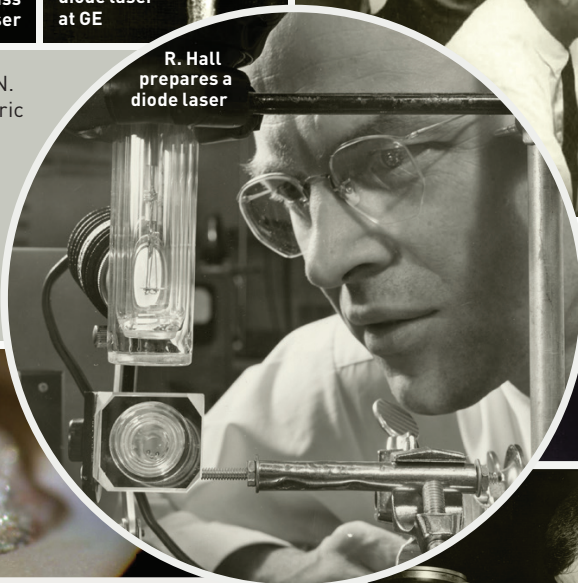
4 October 1962: Paper received by *Applied Physics Letters*

M.I. Nathan et al.
Appl. Phys. Lett. **1**,
62 [1 Nov. 1962]

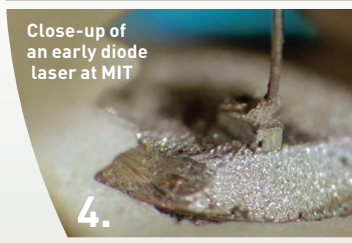
16 September 1962: Robert N. Hall and team at General Electric Schenectady operate the first semiconductor diode laser

24 September 1962: Paper received by *Physical Review Letters*

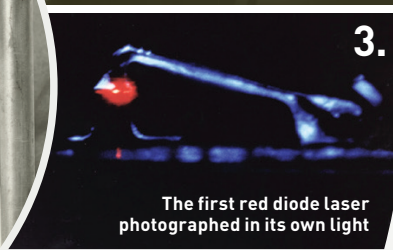
R.N. Hall et al. Phys. Rev. Lett. **9**,
366 [1 Nov. 1962]



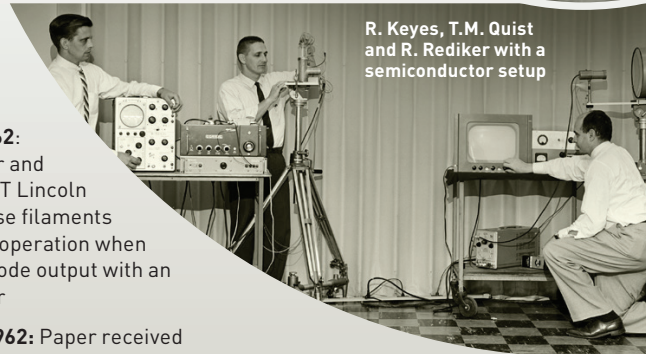
R. Hall prepares a diode laser



Close-up of an early diode laser at MIT



The first red diode laser photographed in its own light



R. Keyes, T.M. Quist and R. Rediker with a semiconductor setup

12 October 1962: Robert Rediker and Ted Quist at MIT Lincoln Lab spot intense filaments showing laser operation when examining a diode output with an infrared viewer

5 November 1962: Paper received by *Applied Physics Letters*

T.M. Quist et al. Appl. Phys. Lett. **1**,
91 [Dec. 1962]



N. Holonyak examining his laser diode

10 October 1962: Nick Holonyak Jr. of GE Syracuse adds phosphorous to GaAs to make a red-emitting GaAsP diode laser

17 October 1962: Paper received by *Applied Physics Letters*

N. Holonyak Jr. et al. Appl. Phys. Lett.,
1, 82 [Dec. 1962]

The first semiconductor lasers were homojunction devices that operated only when cooled. The race continued for a diode laser that could emit continuously at room temperature. For more on the story of the first diode lasers and what followed, see "The Breakthrough Birth of Diode Lasers, OPN," July/August 2007, p. 38.

Sources: J. Hecht, OPN July/Aug 2007; R.D. Dupuis, OPN April 2004. Images courtesy of General Electric, IBM T.J. Watson Research Center, N. Holonyak Jr./IEEE, and MIT Lincoln Laboratory. Complete credits are online at www.osa-opn.org/diode-1962. Infographic by Alessia Kirkland