by using for example a germanium layer grown on silicon, the necessary doping level is thus reduced at 4×10^{19}cm^{-3} to obtain the population inversion in germanium below the 10 kA cm^{-2} range.

6. Conclusion

In conclusion, we have shown room-temperature electroluminescence with *n*-doped and tensile-strained germanium layers. We use Schottky contacts to perform carrier injection in a resonant device with a tensile biaxial strain up to 0.72%. The impact of the metal is minimized using a low area contact configuration, either in the case of strain transfer, or for the optical properties, as the obtained results by electroluminescence are similar to the one under optical pumping. Thus by optimizing the process, and starting on germanium on silicon layer, with an initial strain of 0.25%, the total amount of strain is foreseen to be close to 1.0% and the current density threshold to reach population inversion could be drastically reduced below the 10 kA cm^{-2} range.

Acknowledgments

This work was supported by Agence Nationale de la Recherche under GRAAL convention (ANR 2011 B S03 004 01) and by "Triangle de la Physique" under Gerlas convention. This work was also partly supported by the RENATECH network and by Région Ile de France (C'Nano2011-Nanoetch project). M. Prost is funded by a CIFRE Grant.

#231302 - $15.00 USD Received 23 Dec 2014; revised 20 Feb 2015; accepted 20 Feb 2015; published 3 Mar 2015