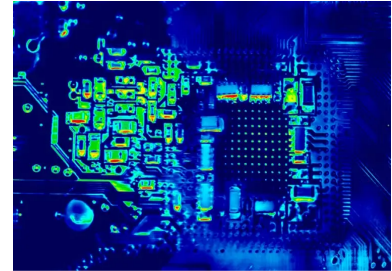


# Bachelor-Thesis

## Voltage Bandgap References in 130nm SiGe-BiCMOS Technology

In modern electronics, the precision of voltage references is crucial for the performance and reliability of circuits. Voltage Bandgap References (BGRs) are essential in digital circuits, voltage regulators, and automotive sensors because they need to provide precise reference voltages. By utilizing our cutting-edge technologies and advanced design methods, our department focuses on RF and mmWave circuit design. Therefore, it is necessary to develop an integrated circuit as a highly accurate Voltage Bandgap Reference in 130nm SiGe-BiCMOS technology to meet the high demands. This BGR ensures the required precision and stability under varying temperature conditions.



<https://resources.pcb.cadence.com/blog/2020-what-causes-thermal-hysteresis-in-a-voltage-reference>

The goal is to design and develop topologies for a BGR IC that can provide a constant reference voltage over a range of temperatures (-45 to 125 °C) and remain stable against changes in supply voltage. This work involves researching suitable circuit topologies, designing the IC layout, and performing EM simulations to achieve an accurate estimation of the circuit.

### Requirements:

- Experience in circuit design
- Knowledge of Python or MATLAB
- Good German and English skills

**Upon completion of the work, there are promising career opportunities in the following areas:**

- Automotive
- Communication Technology
- Research and Development

**Supervisor:** M.Sc. Hassan Asgari Garchegani  
**Room:** FE 00.07  
**Phone:** +49 202 439-1842  
**Email:** [asgarigarchegan@uni-wuppertal.de](mailto:asgarigarchegan@uni-wuppertal.de)