A. Sujet bibliographique:

The comparators are used in MAPS [1] to provide digital processing of analogue signals. As the space used by the processing electronics and power consumption is an important concern in MAPS, one need to optimize comparator circuit for application in MAPS. The amplification stage of comparator can use different types of amplifiers: differential or single ended. For the single ended amplifier the layout and power consumption is smaller, compared to differential amplifiers. In both cases, the circuits should have an offset compensation techniques.

B. Description du stage:

Study and compare different comparator circuits, where differential and single ended amplifiers are used. 
Investigate possibility to use cascaded circuits of NMOS-based high gain amplifiers [2] in the comparator block. Design and study the properties of the comparator with compensated offset using this type of amplifier with time variant feedback [3]. 
The properties of comparator to be optimized are: threshold voltage variation (<0.5mV) due to the CMOS process variation, speed (<100ns), power consumption and the layout space.


[2] A. Dorokhov, NMOS-based high gain amplifier for MAPS, VIIth International meeting on front end electronics for high energy, nuclear and space applications, Perugia, Italy 17-20 May 2006