High Dynamic Range CMOS Image Sensor

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In this project, we designed a CMOS image sensor that provides a better contrast than typical sensors.

- Human eye response is logarithmic
- We use two linear photo-diodes to approximate the human eye response curve
The system of our project consists of four blocks:

1) Pixel
2) Feedback
3) Decoder
4) Analog to digital converter
The following graph shows the Hspice simulation result for a large diode current (20nA) and a small diode current (2pA):

- Traditional sensor provides a dynamic range of 54dB, while our sensor gives 80dB.
- The contrast ratio is 20 times better than typical sensors!
- This means that cameras can produce higher quality digital photographs with our sensor!