Principles of Communications

ECS 332

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8. PCM

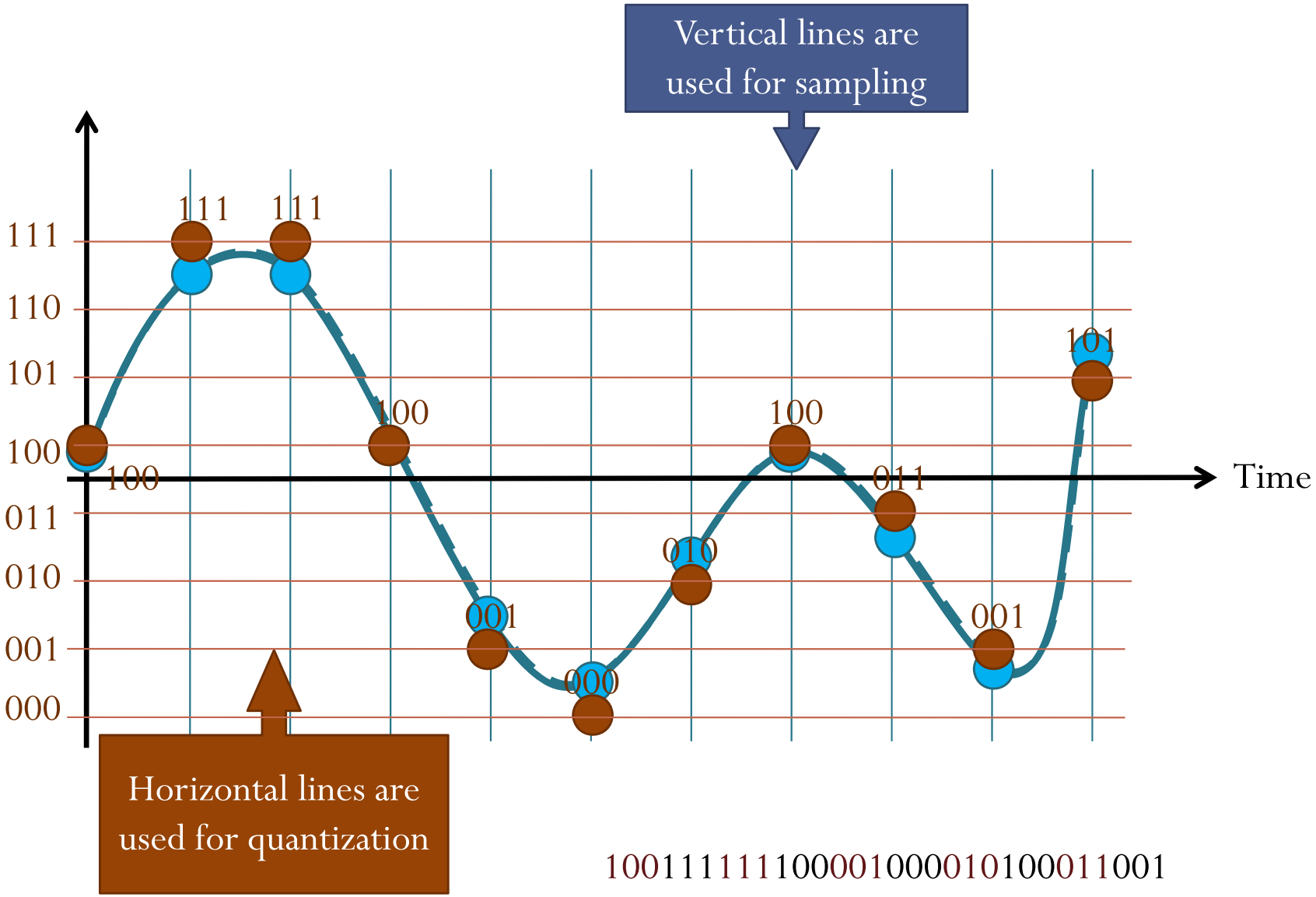
Office Hours:

BKD, 6th floor of Sirindhralai building

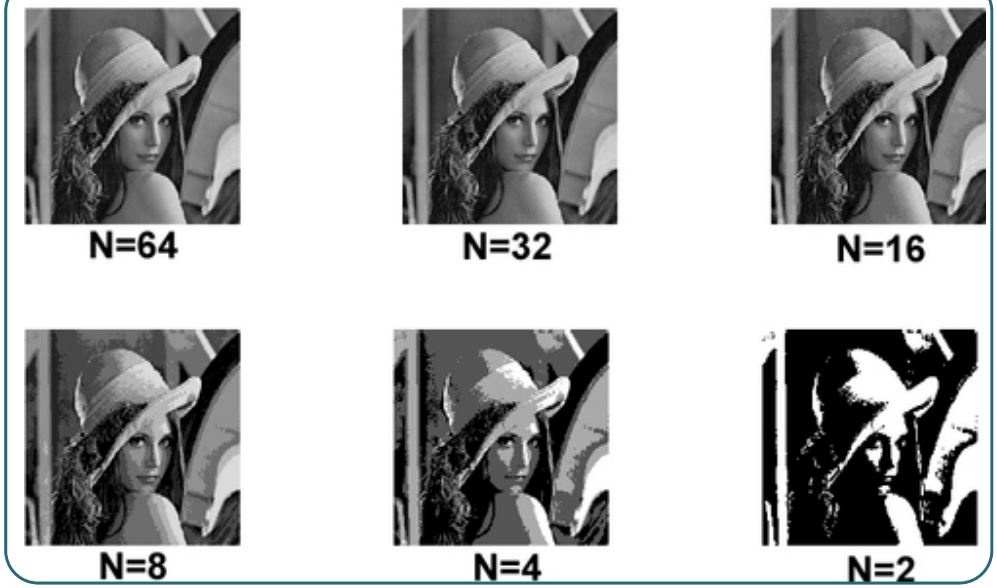
Wednesday 14:00-15:30

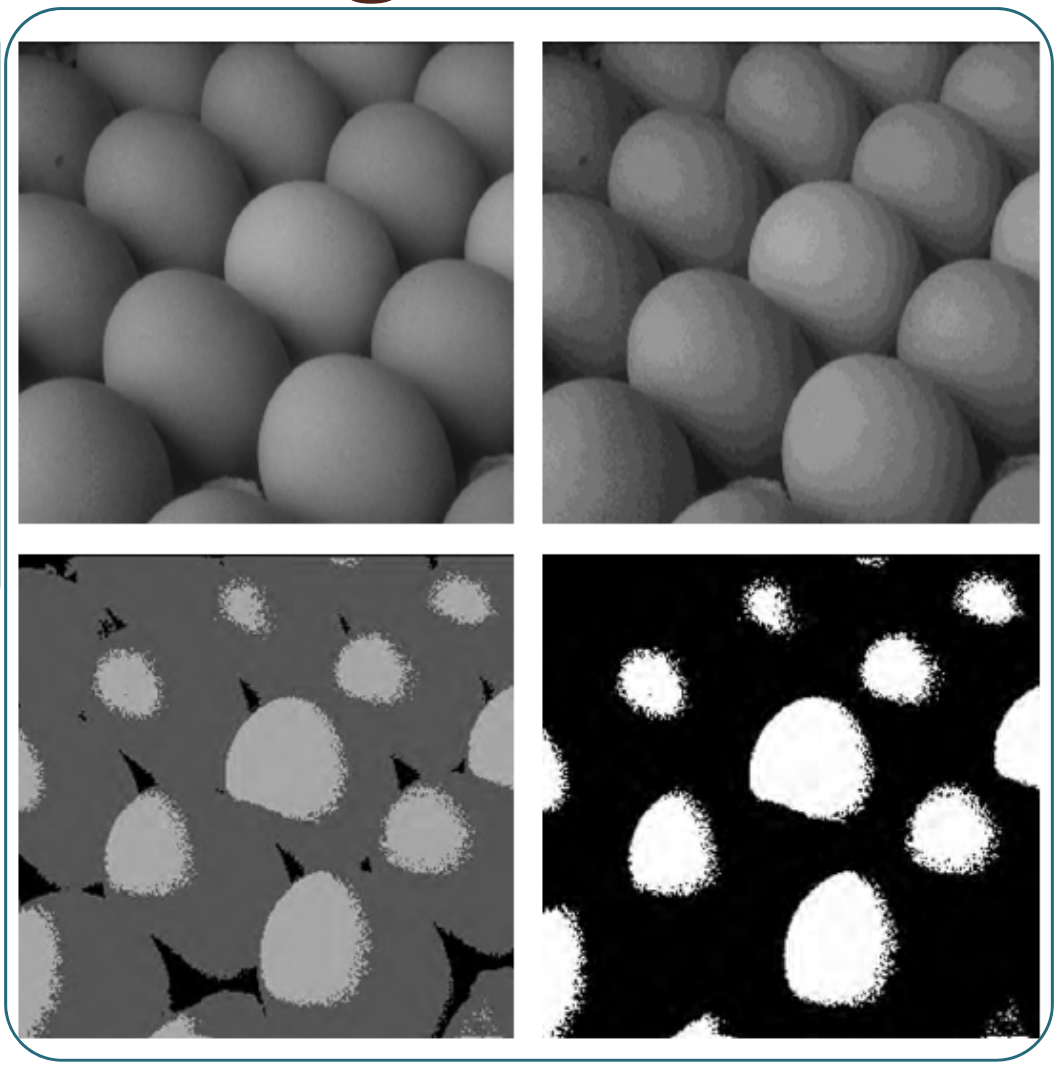
Friday 14:00-15:30

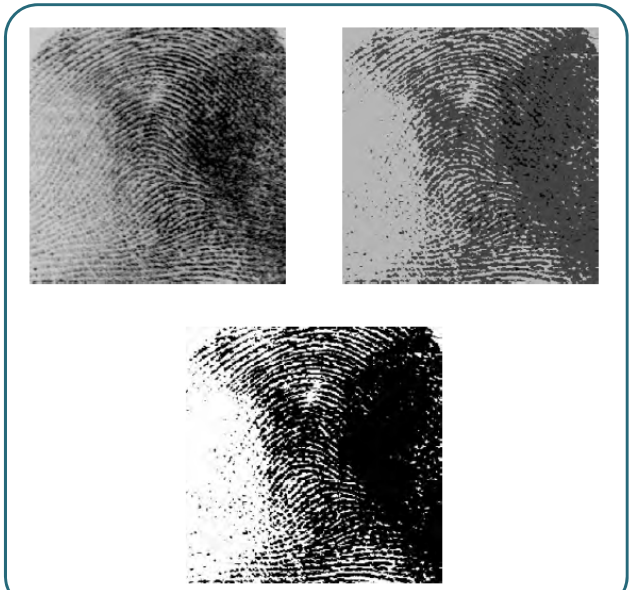
Digitization (analog to digital)



Quantization in 2D Image



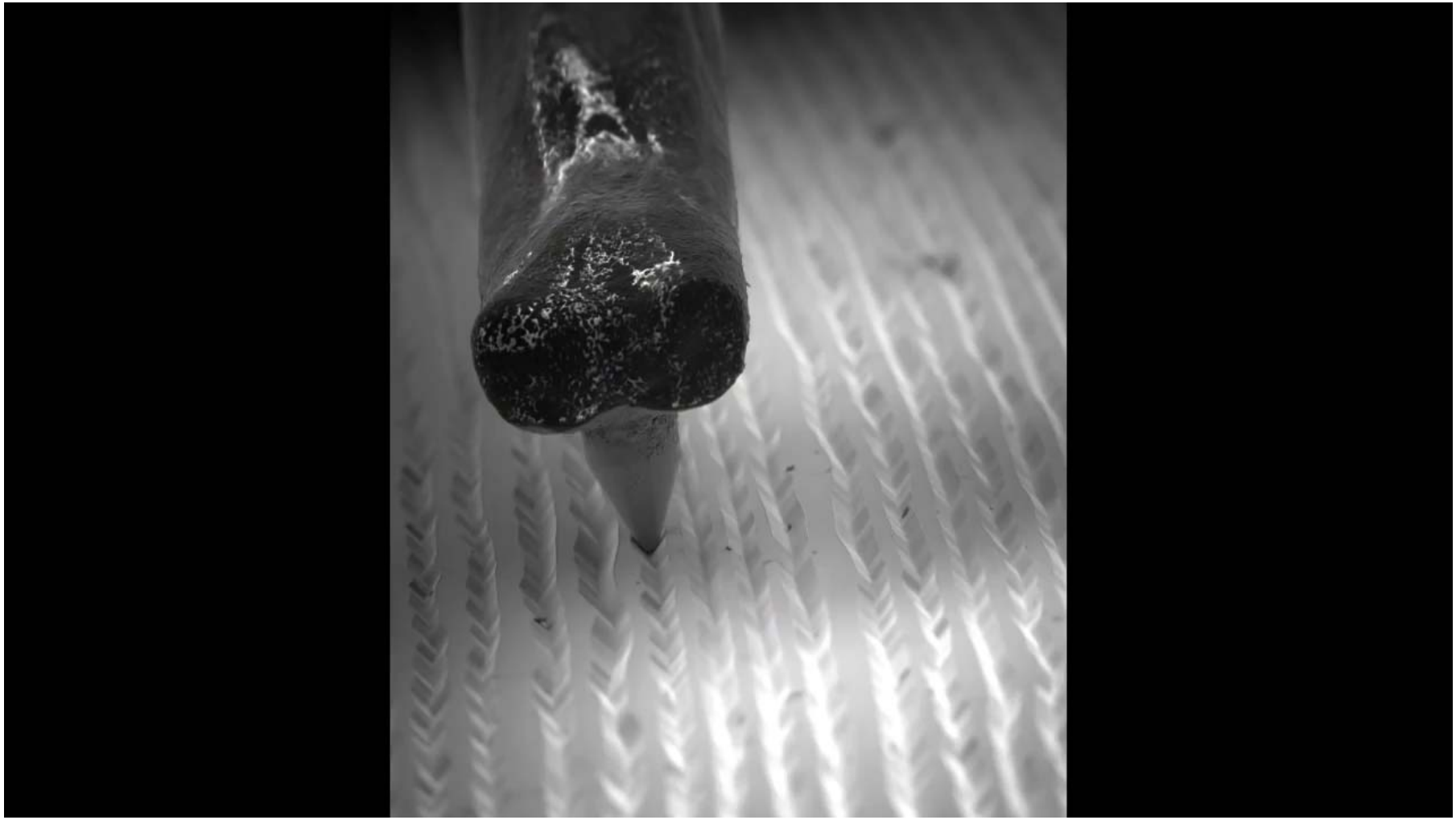




Analog Storage Example: LP record

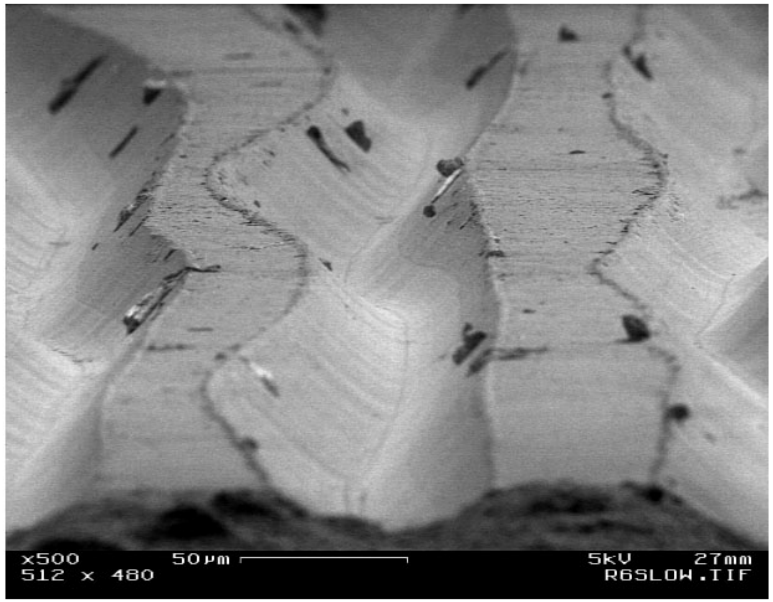
- From “long playing” or “long play”
- An analog sound storage medium, a vinyl record format.
- The sound vibration waveforms are recorded as corresponding physical deviations of a spiral groove engraved, etched, incised, or impressed into the surface of a disc, called a “record”.

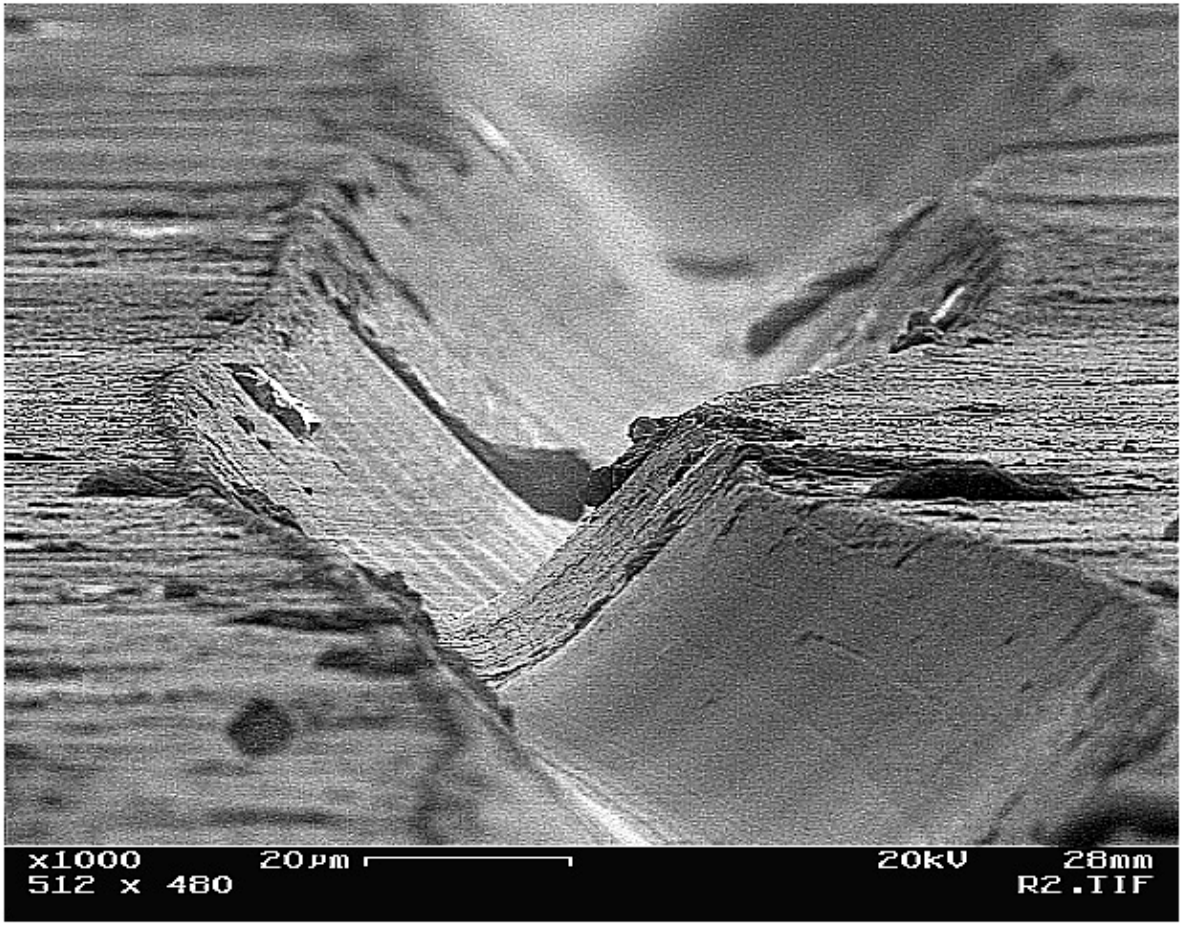
Phonograph needle riding in the LP grooves under an electron microscope



[https://www.youtube.com/watch?v=GuCdsyCWmt8]

Grooves on a vinyl record



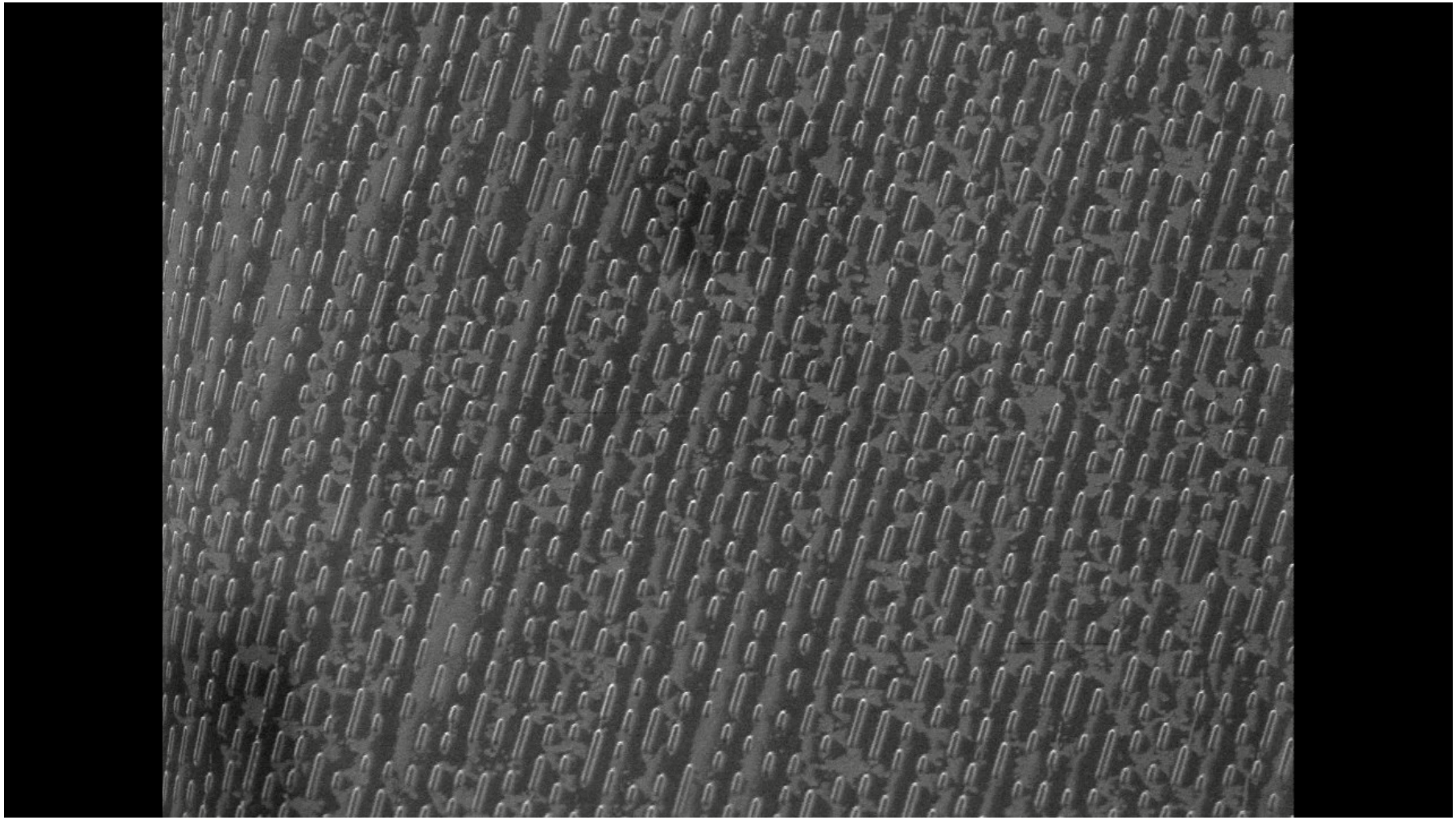


[http://www.synthgear.com/2014/audio-gear/record-grooves-electron-microscope]

Digital Storage Example: CD

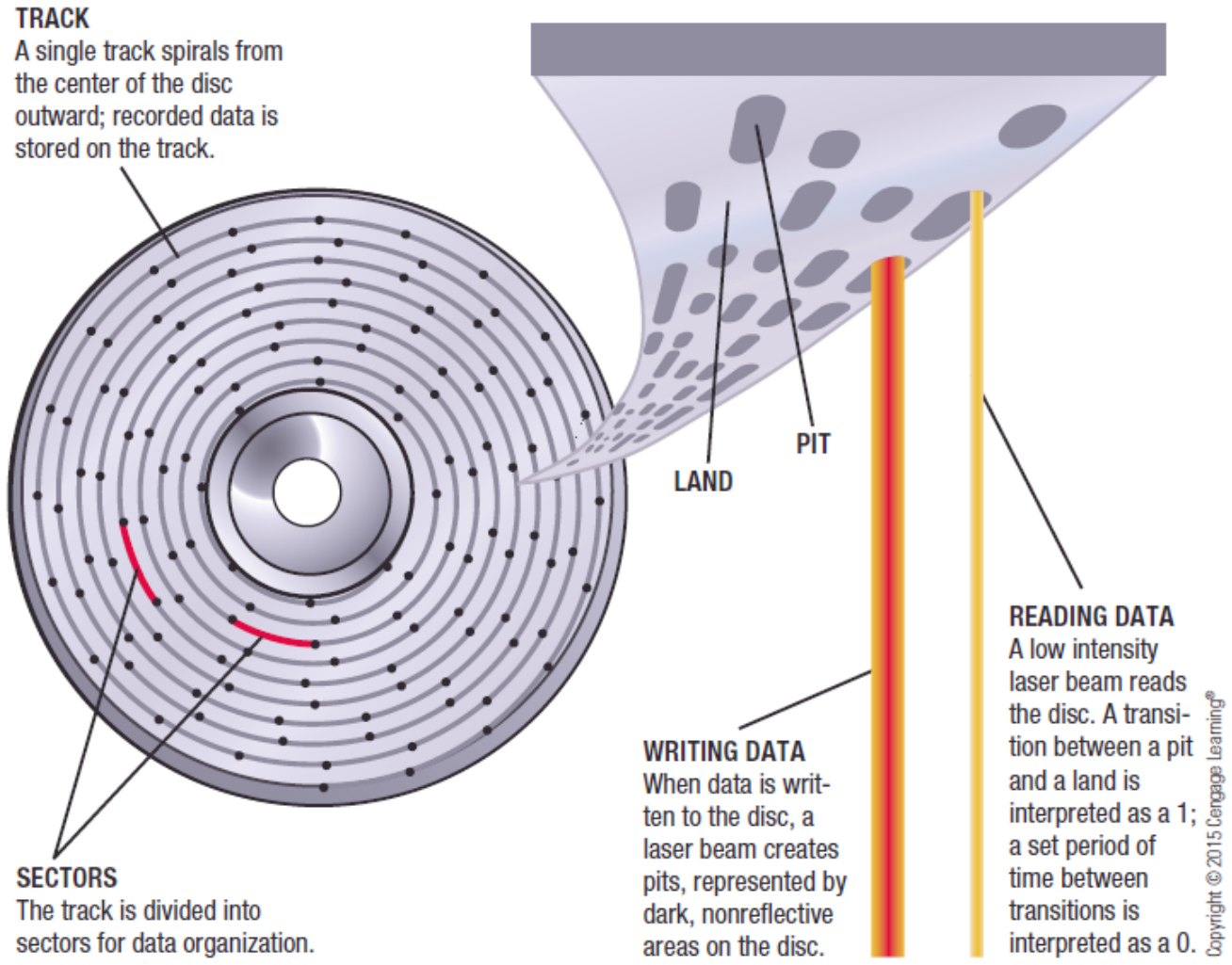
[https://www.youtube.com/watch?v=GuCdsyCWmt8]

CD



[https://www.youtube.com/watch?v=GuCdsyCWmt8]

CD


TRACK
A single track spirals from the center of the disc outward; recorded data is stored on the track.
LAND
PIT
READING DATA
A low intensity laser beam reads the disc. A transition between a pit and a land is interpreted as a 1; a set period of time between transitions is interpreted as a 0.
WRITING DATA
When data is written to the disc, a laser beam creates pits, represented by dark, nonreflective areas on the disc.
SECTORS
The track is divided into sectors for data organization.
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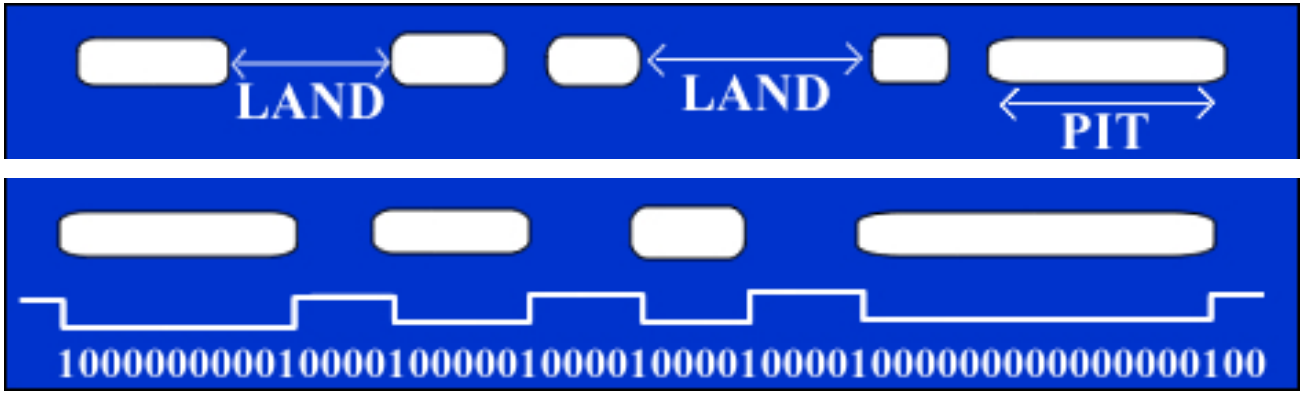
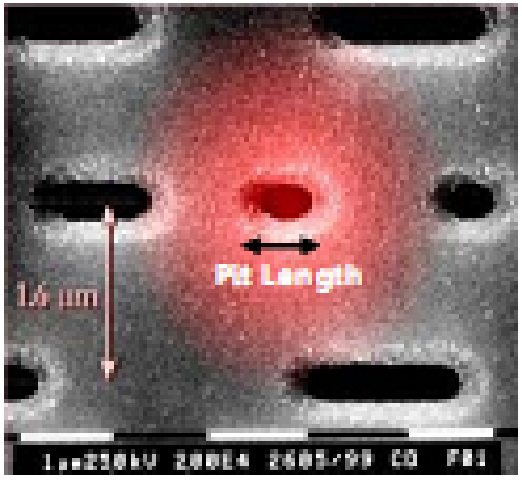

LAND
LAND
PIT
10000000001000010000010000100001000010000000000000000100

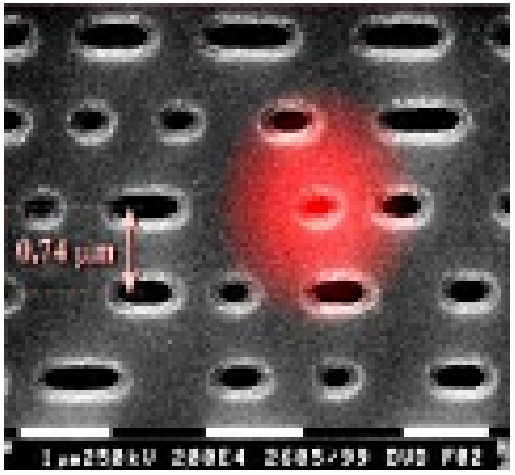
CD, DVD and Blu-ray Pits and Tracks

CD 0.7GB



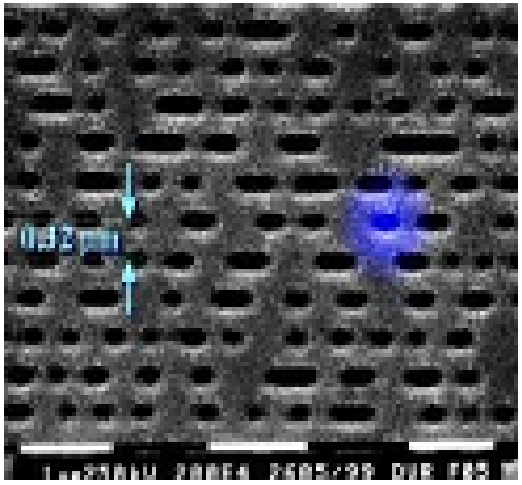
Track Pitch: 1,6 um
Minimum Pit Length: 0,8 um
Storage Density: 0,41Gb/in²

DVD 4.7GB



Track Pitch: 0,74um
Minimum Pit Length: 0,4um
Storage Density: 2,77Gb/in²

Blu-ray Disc 25GB



Track Pitch: 0,32um
Minimum Pit Length: 0,15um
Storage Density: 14,73Gb/in²

[http://www.myce.com/review/Sony-BWU-100A-Blu-ray-Burner-Review-13464/]