DNA has multiple levels of organization

from Wikipedia entry for "Chromatin"
DNA has multiple levels of organization

from Wikipedia entry for "Chromatin"
Naked DNA

- highly charged (~1e / bp)
- Kuhn length ~106 nm or 310 bp
- the largest human chromosome would have gyration radius of ~100 micron (SAW)

from Wikipedia entry for DNA

AFM image of Lambda DNA (~16 micrometers long), from M.Guthold website
Nucleosomes provide the second level of DNA organization

- 146 bp / nucleosome + ~10 bp / linker
- neutralize ~50% of DNA negative charges
- interact with each other to form higher-order fibers (parameters are still discussed)
- provide additional linear compaction of ~5-50, depending on salt conditions and state of nucleosomes
- can have hundreds of different biochemical modifications providing extra informational storage

from Wikipedia entry for "Nucleosome"