Fiber Optics Cheat Sheet

Basics:

Fiber Optics = Light + Glass/Plastic Cables

Used to transmit data as pulses of light over long distances.

Much faster & more reliable than copper wires.

How It Works:

Core: Center of the fiber (light travels through it).

Cladding: Surrounds the core, reflects light back in (total internal reflection).

Jacket: Outer protection.

Key Terms:

TIR (Total Internal Reflection): Principle behind light staying inside the fiber.

Attenuation: Signal weakening.

Bandwidth: How much data you can send.

Dispersion: Signal spreading out = blurrier data.

Types of Fibers:

Single-mode:

- Core Size: 9 µm
- Distance: Long range
- Speed: Very fast

Multi-mode:

- Core Size: 50-62.5 µm
- Distance: Short range
- Speed: Slower

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Applications:

Internet (broadband, FTTH)

Medical (endoscopy)

Defense (secure communications)

Networking (data centers)

5G & IoT Backhaul

Future Trends:

Higher Bandwidth (Terabits/s)

Quantum Communications

Smart Cities

5G Backbone