Doppler Ultrasound

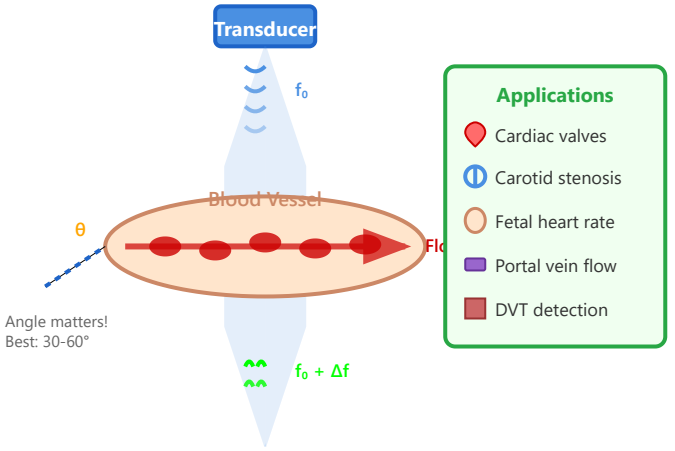
Doppler shift principle
Frequency change with moving blood

Color flow mapping
Direction and velocity visualization

Power Doppler
More sensitive to low flow

Spectral analysis
Velocity vs time waveforms

Clinical applications
Vascular, cardiac, obstetric imaging



Doppler Equation

$$\Delta f = 2 \cdot f_0 \cdot v \cdot \cos\theta / c$$

Δf = frequency shift
v = blood velocity, θ = angle

Color Doppler Mapping

Away — No flow — Toward

Spectral Doppler (Velocity vs Time)