Quantitative and localized spectroscopy for non-invasive bilirubinometry in neonates

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## List of symbols

### General
- **t**: time
- **f**: frequency
- **λ**: wavelength
- **k**: wave number
- **d**: depth
- **ε**: geometrical path length
- **Δλ**: wavelength resolution
- **Δk**: wave number resolution
- **Δf**: frequency resolution
- **hv**: photon energy
- **Ø**: diameter
- **r**: radius
- **D**: thickness

### Optical properties
- **μₐ**: absorption coefficient
- **μₜ**: attenuation coefficient
- **μₛ**: scattering coefficient
- **μₛ**: reduced scattering coefficient
- **μₜ,NA**: NA-corrected μₜ
- **μₑff**: effective attenuation coefficient
- **p(θ)**: scattering phase function
- **g**: scattering anisotropy
- **n**: phase refractive index
- **nₑ**: group refractive index
- **a**: scattering scaling factor
- **b**: scatter power
- **c**: chromophore concentration

### Diffusion theory
- **I**: spectral intensity
- **R**: remittance
- **rₛ**: fiber distance from source
- **zₛ**: modeled source position
- **zₑ**: modeled virtual source position
- **A**: empirical parameter
- **α**: proportionality factor
- **β, γ**: validity limiting parameters

### LCS system and geometry
- **xₛ**: sample arm length
- **xᴿ**: reference arm length
- **ΔL**: optical path length difference
- **λₒ**: center wavelength
- **λₑFWHM**: wavelength bandwidth
- **lₑ**: coherence length
- **S₀**: source power spectrum
- **Tₑ**: system coupling efficiency
- **ζ**: system calibration constant
- **α**: scaling factor
- **εₑ**: focus position in path length units
- **Zᵣ**: Rayleigh length
- **w**: beam waist
- **Ω**: solid angle
- **θ**: (focusing) angle
- **M**: number of modes

### LCS acquisition
- **Δxₛ**: sample arm displacement
- **Δxᴿ**: reference arm displacement
- **vᵣ**: reference mirror velocity
- **fᵣ**: reference mirror scanning frequency
- **ΔR**: reference mirror scanning amplitude
- **Δlₑ**: path length scanning window
- **N**: number of samples
- **fₛ**: sampling frequency

### Brownian motion
- **Δfₑ**: Doppler frequency shift
- **κₑ**: Boltzmann constant
- **T**: temperature
- **η**: viscosity

### LCS spectroscopic detection
- **ηₛ, ηᴿ**: sample/reference arm fraction
- **dₑ, ΔLₑMax**: imaging depth/path length
- **δkₑ, δλ**: spectrometer pixel width
- **Nₑ**: # pixels
- **τ**: integration time
- **fₒ**: Doppler frequency
- **ε**: detection efficiency
- **Δlₑ**: reference mirror scanning window
- **Δlₛ**: spectrograph probing window

**Bold-faced** printed characters in this thesis denote wavelength dependent parameters.