Quantitative and localized spectroscopy for non-invasive bilirubinometry in neonates

Bosschaart, N.

Citation for published version (APA):

General rights
It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations
If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: https://uba.uva.nl/en/contact, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.
List of symbols

general
\( t \) time
\( f \) frequency
\( \lambda \) wavelength
\( k \) wave number
\( d \) depth
\( \varepsilon \) geometrical path length
\( \Delta \lambda \) wavelength resolution
\( \Delta k \) wave number resolution
\( \Delta f \) frequency resolution
\( h \) photon energy
\( \varnothing \) diameter
\( r \) radius
\( D \) thickness

optical properties
\( \mu_t \) attenuation coefficient
\( \mu_a \) absorption coefficient
\( \mu_s \) scattering coefficient
\( \mu_s^{\text{red}} \) reduced scattering coefficient
\( \mu_b \) backscattering coefficient
\( \mu_{b,\text{NA}} \) NA-corrected \( \mu_b \)
\( \mu_{\text{eff}} \) effective attenuation coefficient
\( p(\theta) \) scattering phase function
\( g \) scattering anisotropy
\( n \) phase refractive index
\( n_g \) group refractive index
\( a \) scattering scaling factor
\( b \) scatter power
\( c \) chromophore concentration

diffusion theory
\( l \) spectral intensity
\( R \) remittance
\( r_j \) fiber distance from source
\( z_0 \) modeled source position
\( z_b \) modeled virtual source position
\( A \) empirical parameter
\( \alpha \) proportionality factor
\( \beta, \gamma \) validity limiting parameters

LCS system and geometry
\( x_S \) sample arm length
\( x_R \) reference arm length
\( \Delta L \) optical path length difference
\( \lambda_0 \) center wavelength
\( \lambda_{\text{FWHM}} \) wavelength bandwidth
\( I_c \) coherence length
\( S_0 \) source power spectrum
\( T_c \) system coupling efficiency
\( \zeta \) system calibration constant
\( \alpha \) scaling factor
\( \xi_f \) focus position in path length units
\( Z_R \) Rayleigh length
\( w \) beam waist
\( Q \) solid angle
\( \theta \) (focusing) angle
\( M \) number of modes

LCS acquisition
\( \Delta x_S \) sample arm displacement
\( \Delta x_R \) reference arm displacement
\( \nu_R \) reference mirror velocity
\( f_R \) reference mirror scanning frequency
\( \Delta R \) reference mirror scanning amplitude
\( \Delta \varepsilon \) path length scanning window
\( N \) number of samples
\( f_s \) sampling frequency

Brownian motion
\( \Delta f_D \) Doppler frequency shift
\( k_B \) Boltzmann constant
\( T \) temperature
\( \eta \) viscosity

LCS spectroscopic detection
\( \eta_S, \eta_R \) sample/reference arm fraction
\( d_{\max}, \Delta L_{\max} \) imaging depth/path length
\( \delta k, \delta \lambda \) spectrometer pixel width
\( N_p \) # pixels
\( \tau \) integration time
\( f_D \) Doppler frequency
\( \varepsilon \) detection efficiency
\( \Delta \varepsilon_R \) reference mirror scanning window
\( \Delta \varepsilon_S \) spectrograph probing window

(bold-faced printed characters in this thesis denote wavelength dependent parameters)