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Quantitative and localized spectroscopy for non-invasive bilirubinometry in neonates

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List of symbols

<u>general</u>		<u>LCS system and geometry</u>	
t	time	x_S	sample arm length
f	frequency	x_R	reference arm length
λ	wavelength	ΔL	optical path length difference
k	wave number	λ_0	center wavelength
d	depth	λ_{FWHM}	wavelength bandwidth
ℓ	geometrical path length	l_c	coherence length
$\Delta\lambda$	wavelength resolution	S_0	source power spectrum
Δk	wave number resolution	T_c	system coupling efficiency
Δf	frequency resolution	ζ	system calibration constant
h ν	photon energy	α	scaling factor
\varnothing	diameter	ℓ_F	focus position in path length units
r	radius	Z_R	Rayleigh length
D	thickness	w	beam waist
<u>optical properties</u>		Ω	solid angle
μ_t	attenuation coefficient	θ	(focusing) angle
μ_a	absorption coefficient	M	number of modes
μ_s	scattering coefficient	<u>LCS acquisition</u>	
μ_s	reduced scattering coefficient	Δx_S	sample arm displacement
μ_b	backscattering coefficient	Δx_R	reference arm displacement
$\mu_{b,NA}$	NA-corrected μ_b	v_R	reference mirror velocity
μ_{eff}	effective attenuation coefficient	f_R	reference mirror scanning frequency
$p(\theta)$	scattering phase function	ΔR	reference mirror scanning amplitude
g	scattering anisotropy	$\Delta\ell$	path length scanning window
n	phase refractive index	N	number of samples
n_g	group refractive index	f_s	sampling frequency
a	scattering scaling factor	<u>Brownian motion</u>	
b	scatter power	Δf_D	Doppler frequency shift
c	chromophore concentration	k_B	Boltzmann constant
<u>diffusion theory</u>		T	temperature
I	spectral intensity	η	viscosity
R	remittance	<u>LCS spectroscopic detection</u>	
r_j	fiber distance from source	η_S, η_R	sample/reference arm fraction
z_0	modeled source position	$d_{max}, \Delta L_{max}$	imaging depth/path length
z_b	modeled virtual source position	$\delta k, \delta\lambda$	spectrometer pixel width
A	empirical parameter	N_p	# pixels
α	proportionality factor	τ	integration time
β, γ	validity limiting parameters	f_D	Doppler frequency
<u>LCS signal description</u>		ϵ	detection efficiency
E_S	electric field in the sample arm	$\Delta\ell_R$	reference mirror scanning window
E_R	electric field in the reference arm	$\Delta\ell_S$	spectrograph probing window
E_D	electric field at the detector	(bold-faced printed characters in this thesis denote wavelength dependent parameters)	
I_S	sample arm intensity		
I_R	reference arm intensity		
i_D	photo detector current		
i_{AC}	AC photo detector current		
S	power spectrum		