Synchronous phase-demodulation of concentric-rings Placido mires in corneal topography and wavefront aberrometry (theoretical considerations)

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This paper presents a digital interferometric method to demodulate Placido fringe patterns. This method uses a computer-stored conic-wavefront as reference carrier. Even though, Placido mires are widely used in corneal topographers. This is not however a paper on corneal topography and/or its clinical use. This paper focuses on the theoretical aspects to phase-demodulate Placido mires using synchronous interferometric techniques. Placido patterns may also be applied to test optical wavefronts using a Placido-Hartmann opaque plate with periodic annular apertures. This test is sensitive to the radial slope of the measuring wavefront. Another wavefront testing approach may use a Placido-Hartmann-Shack screen with a periodic array of toroidal lenslets. This periodic screen is sensitive to the wavefront's radial-slope at the focal plane of the lenslets. In brief, digital interferometric methods are herein applied for the first time to demodulate conic-carrier Placido images. (Patent pending at the USPTO).

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