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(54) **OPTICAL ALIGNMENT APPARATUS AND METHODOLOGY FOR A VIDEO BASED METROLOGY TOOL**

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See application file for complete search history.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

3,766,466 A *	10/1973	Faries .....	H01S 3/125
			372/105
4,180,325 A *	12/1979	Humphrey .....	G01M 11/0235
			356/127
5,066,120 A *	11/1991	Bertrand .....	G01M 11/0257
			356/124
5,576,780 A *	11/1996	Yancey .....	A61B 3/103
			351/209
5,661,816 A *	8/1997	Fantone .....	G01M 11/0242
			382/100
2012/0025714 A1*	2/2012	Downing, Jr. ....	H01S 5/02292
			315/149
2013/0128333 A1*	5/2013	Agrawal .....	G02F 1/161
			359/273

\* cited by examiner

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(57) **ABSTRACT**

A system for quickly aligning a test optic with various components of an optical metrology tool. A collimated target is presented to a beamsplitting reference surface located on a positioning system for holding and manipulating the test optic. Video images of the target and its reflection from the reference surface are displayed for analysis and visualization so that any tilt between the reference surface and the optical axis of the collimated beam can be removed to align the test optic. After alignment, the video based system is used to quickly measure and display in real-time a variety of performance characteristics of optical components such as lenses. The metrology system is under the control of a computer which uses a windowing software program to provide the user with a graphical user interface by which the various components of the system and test lenses may be aligned and characterized.

**15 Claims, 1 Drawing Sheet**

