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Zhang

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(54) **METHOD FOR COMPENSATING SLIT ILLUMINATION UNIFORMITY**
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CPC **G03F 7/70066** (2013.01); **G03F 7/20** (2013.01); **G03F 7/70083** (2013.01); **G03F 7/70558** (2013.01)

(58) **Field of Classification Search**
CPC G03F 7/70083; G03F 7/70066; G03F 7/70075; G03F 7/70191
See application file for complete search history.

(56) **References Cited**
U.S. PATENT DOCUMENTS
7,532,308 B2* 5/2009 Bouman G03F 7/70083 355/67
8,629,973 B2 1/2014 Zimmerman
2005/0286037 A1* 12/2005 Chung G03B 27/74 355/69
2006/0139608 A1* 6/2006 Wiener G02B 7/346 355/69
2007/0057201 A1* 3/2007 Neerhof G03F 7/70191 250/492.2
2007/0103665 A1* 5/2007 Zimmerman G02B 7/346 355/68
2007/0139630 A1 6/2007 Kleman
2010/0302525 A1* 12/2010 Zimmerman G03F 7/70133 355/71

* cited by examiner
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(57) **ABSTRACT**
A method for compensating a slit illumination uniformity includes executing a first lithography operation and recording an initial slit uniformity profile; executing a slit uniformity optimization process and recording an optimized slit uniformity profile; and offsetting the optimized slit uniformity profile to obtain a working slit uniformity profile such that the working slit uniformity profile has a mean value closest to that of the initial slit uniformity profile.

11 Claims, 3 Drawing Sheets

