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(54) **SURFACE PLASMON ASSISTED
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(75) Inventors: **Zygmunt Gryczynski**, Fort Worth, TX (US); **Ignacy Gryczynski**, Fort Worth, TX (US); **Nils Calander**, Goteborg (SE); **Julian Borejdo**, Dallas, TX (US)

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(57) **ABSTRACT**

The present invention includes a microscope and a method for using the microscope for single molecule with reduced photobleaching of a fluorophore (20) that includes a light translucent material (16); a metal layer (18) disposed on the light translucent material (16); a medium (15) disposed on the metal layer (18), the medium (15) having one or more fluorophores (20) capable of binding a target analyte (e.g., inside a cell); a microscope positioned to observe the surface plasmon emissions from the one or more fluorophores (20) within 50 nanometers of the surface of the metal layer (18); an excitation source capable of exciting the one or more fluorophores (20), the excitation source positioned to strike the light translucent material (16) at a first angle; and a light detector (38) that selectively detects emitted light generated by excited fluorophores (20) at a second angle (22), wherein light emitted by the one or more fluorophores (20) at the surface plasmon angle is detected through the microscope, such that single molecules may be detected without significantly degrading fluorophore (20) emissions.

Correspondence Address:
CHALKER FLORES, LLP
2711 LBJ FRWY, Suite 1036
DALLAS, TX 75234 (US)

(73) Assignee: **University of North Texas Health Science Center at Fort Worth**, Fort Worth, TX (US)

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