

**EX PARTE  
REEXAMINATION CERTIFICATE  
ISSUED UNDER 35 U.S.C. 307**

THE PATENT IS HEREBY AMENDED AS  
INDICATED BELOW.

**Matter enclosed in heavy brackets [ ] appeared in the patent, but has been deleted and is no longer a part of the patent; matter printed in italics indicates additions made to the patent.**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 3-6 is confirmed.

Claims 1-2 are cancelled.

Claims 7, 14, 15, 16 and 23 are determined to be patentable as amended.

Claims 8 and 9, dependent on an amended claim, are determined to be patentable.

New claim 24 is added and determined to be patentable.

Claims 10-13 and 17-22 were not reexamined.

7. The atomic force microscope of claim [1] 24 including means for disposing the plane of the focus of the incident beam coincident with the plane of said cantilever.

14. The atomic force microscope of claim [1] 24 in which the wavelength of light from said light source is 670 nm and said numerical aperture is greater than 0.05.

15. In an atomic force microscope of including at least one cantilever mounted therein and an optical detector, the improvement, for generating a small incident beam spot, comprising:

- an optical system including a light source and means for producing a *beam of light consisting essentially of a single beam, which forms said* focused incident beam;
- means for directing said focused incident beam onto said cantilever to reflect therefrom to said detector, *the detector being responsive to a beam of light consisting essentially of said reflected focused incident beam*;
- means for defining an aperture in the path of said incident beam; and
- means for adjusting the size of said aperture whereby to control the size of said incident beam spot on said cantilever;
- said optical system having a numerical aperture sufficient with the wavelength of light from said light source whereby said focused beam forms a spot on said cantilever having a size of 8 μm or less in at least one dimension.

16. In an atomic force microscope of including at least one cantilever mounted therein and an optical detector, the improvement, for generating a small incident beam spot, comprising:

- an optical system including a light source and means for producing a *beam of light consisting essentially of a single beam, which forms said* focused incident beam;
- means for directing said focused incident beam onto said cantilever to reflect therefrom to said detector, *the detector being responsive to a beam of light consisting essentially of said reflected focused incident beam*;
- means for defining an aperture in the path of said incident beam; and
- means for adjusting the shape of said aperture whereby to control the shape of said incident beam spot on said cantilever;
- said optical system having a numerical aperture sufficient with the wavelength of light from said light source whereby said focused beam forms a spot on said cantilever having a size of 8 μm or less in at least one dimension.

23. In an atomic force microscope:

- an optical detector;
- a cantilever having a length of less than 30 μm;
- an optical system including a light source and means for producing a *beam of light consisting essentially of a single beam, which forms said* focused incident beam; and
- means for directing said focused incident beam onto said cantilever to reflect therefrom to said detector, *the detector being responsive to a beam of light consisting essentially of said reflected focused incident beam*;
- the components of said optical system being arranged so that at least portions of said incident and reflected beams overlap, and including means for separating said reflected beam from said incident beam and directing said separated reflected beam to said detector*;
- said optical system having a numerical aperture sufficient with the wavelength of light from said light source whereby said focused beam forms a spot on said cantilever having a size of 8 μm or less in at least one dimension.

24. In an atomic force microscope including at least one cantilever mounted therein and an optical detector, the improvement, for generating a small incident beam spot, comprising:

- an optical system including a light source and means for producing a beam of light consisting essentially of a single beam, which forms said incident beam, and at least one lens for focusing said incident beam; and*
- means for directing said focused incident beam onto said cantilever to reflect therefrom to said detector, the detector being responsive to a beam of light consisting essentially of said reflected focused incident beam;*
- the components of said optical system being arranged so that at least portions of said incident and reflected beams overlap, and including means for separating said reflected beam from said incident beam and directing said separated reflected beam to said detector;*
- said optical system having a numerical aperture sufficient with the wavelength of light from said light source whereby said focused beam forms said incident beam spot on said cantilever having a size of 8 μm or less in at least one dimension.*