

Claims

1. A method for removing a false signal from a Kerr image of a magnetic sample comprising:
  - a) obtaining a first image of the magnetic sample in a first state of excitation, using a narrowband polariser configured to polarise light of a predetermined wavelength;
  - b) obtaining a second image of the magnetic sample in a second state of excitation, using the narrowband polariser, wherein the second state of excitation is different from the first state of excitation;
  - c) subtracting the first image from the second image at the predetermined wavelength to obtain a raw Kerr image;
  - d) subtracting the first image from the second image at a wavelength for which the narrowband polariser has an extinction ratio of at least two orders of magnitude lower than that for the predetermined wavelength to obtain a false image; and
  - e) removing the false image from the raw Kerr image to obtain a Kerr image with false signals removed.
2. The method according to claim 1 further comprising aligning the first image with the second image prior to step c).
3. The method according to claim 1 or 2 wherein either: i) the first state of excitation is up-saturated and the second state of excitation is down-saturated; or ii) the first state of excitation is down saturated and the second state of excitation is up-saturated.
4. The method according to any one of claims 1 to 3 wherein the predetermined wavelength is that of green light.
5. The method according to any one of claims 1 to 4 wherein the false image is obtained at a wavelength of red light, yellow light or blue light.
6. The method according to any one of claims 1 to 5 wherein the narrowband polariser is configured to have an extinction ratio at the predetermined wavelength that

is at least 3, at least 4 or at least 5 orders of magnitude higher than that of the false image wavelength.

7. An apparatus for Kerr imaging comprising:

a light source and a polariser operable to provide polarised light for incidence on a magnetic sample;

an analyser configured to convert differences in polarisation of the polarised light, after reflection from the magnetic sample, into differences in light intensity; and

a detector configured to detect the differences in light intensity for display as a Kerr image;

wherein at least one non-planar lens is employed between the polariser and the analyser and at least one corrective lens is provided to reduce polarisation aberrations introduced by the at least one non-planar lens.

8. The apparatus according to claim 7 wherein a waveplate is provided to reverse the polarity of the polarisation aberrations.

9. The apparatus according to claim 7 or 8 wherein the corrective lens comprises one or more concave or convex elements.

10. The apparatus according to any one of claims 7 to 9 wherein the corrective lens comprises one or more components comprising a convex lens element adjacent a complementary concave lens element.

11. The apparatus according to claim 10 wherein four such components are employed.

12. The apparatus according to claim 10 or 11 wherein each component comprises convex and concave elements with the same physical and/or optical properties.

13. The apparatus according to any one of claims 7 to 12 wherein at least one non-planar lens is constituted by an objective lens, a convex lens, a concave lens or a tube lens.

14. The apparatus according to any one of claims 7 to 13 wherein the light source is a white light source.

15. The apparatus according to any one of claims 7 to 14 wherein the light source is an LED light source.
16. The apparatus according to any one of claims 7 to 15 wherein the polariser is a narrowband polariser.
17. The apparatus according to any one of claims 7 to 16 wherein the polariser is configured to only polarise green light.
18. The apparatus according to any one of claims 7 to 17 wherein the analyser is a narrowband polariser arranged in a crossed configuration with the polariser.
19. The apparatus according to claim 18 wherein the analyser is arranged perpendicularly to the polariser.
20. The method according to any one of claims 1 to 6 applied to images obtained using the apparatus of any of claims 7 to 19.