

Precise Measurement of Small Bacterium Size by LASER Light

Digambar D. Kulkarni¹, Akbani Alfiya², Burondkar Bushara³

Department of Physics, Dapoli Urban Bank Senior Science College, Dapoli, Ratnagiri, Maharashtra, India
ddkulkarni50@gmail.com, akbanialfiya69@gmail.com, busharaburondkar33@gmail.com

Abstract: LASER light is allowed to pass through water drop and when it is passed through any kind of water, we are able to see the projection of bacterium present in water. The small water drop works as spherical lens with large magnifying power. The image through water is observed to be magnified using LASER light. With the help of this projection through water, the size of bacterium which are not easily visible to us with naked eyes is calculated. Also, percent of magnification takes place with help of LASER is also calculated. The surface of water drop curves outward to make a dome and this outward or convex curvature bends light rays inward. As a result, the object appears magnified than it is. The surface of a smaller drop is even more curved bending the light rays even more inward. The result is the larger magnification; the object appears even larger. As distance between source, screen changes away from water drop the image goes increasing up to a particular distance, where proper image observed which is useful for calculation of size impurities like bacterium. The intensity of LASER light plays a major role for magnification on screen.

Keywords: Bacterium, Intensity, Magnification, LASER, Water drop as a Spherical lens.

REFERENCES

- [1]. <https://flexbooks.ck12.org/cbook/cbse-physics-class-10/section/1.10/primary/lesson/lens-formula-and-magnification/>
- [2]. https://www.researchgate.net/publication/230923479_Water_droplet_lens_microscope_and_microphotographs
- [3]. <https://www.exploratorium.edu/snacks/plankton-projector>
- [4]. <https://www.scientificamerican.com/article/the-magnifying-effect-of-a-water-drop/>
- [5]. <https://www.fmf.uni-lj.si/~planinsic/articles/planin2.pdf>
- [6]. <https://uakron.edu/polymer/agpa-k12outreach/professional-development-modules/the-bending-and-bouncing-of-light>
- [7]. <https://www.sciencelearn.org.nz/resources/48-reflection-of-light#:~:text=Reflection%20is%20when%20light%20bounces,This%20is%20called%20specular%20reflection.>
- [8]. <https://en.wikipedia.org/wiki/Optics>
- [9]. <https://lisbdnet.com/why-does-water-magnify-objects/>
- [10]. <https://byjus.com/questions/drop-of-water-behaves-like-a/>

List of Tables

- Observation table 1.a: Bacterium observed in sea water
- Observation table 1.b: Bacterium observed in tap water
- Observation table 1.c: Bacterium observed in distilled water
- Observation table 1.d: Bacterium observed in potassium dichromate solution for distilled water

List of Figures

- Fig.1. Experimental set up diagram
- Fig.2. Projection through water drop of sea water

- Fig.3. Projection through tap water
- Fig.4. Projection through distilled water
- Fig.5. Projection through Potassium Dichromate solution for distilled water
- Fig.6. Bacterium Present in Portrait dish