CT Scanner
CAF Central Analytical Facilities
STELLENBOSCH UNIVERSITY

CT NEWS

The Stellenbosch CT scanner facility newsletter

Jan 2014 | Volume 2, Number 1

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Recent interesting scans (clickable links)

Wine volume measurement in situ
http://blogs.sun.ac.za/ctscanner/2014/01/10/wine-volume/

X-ray imaging of a light bulb
http://blogs.sun.ac.za/ctscanner/2014/01/10/light-bulb/

Pharmaceuticals – checking the internal structure of pills
http://blogs.sun.ac.za/ctscanner/2014/01/10/pharmaceuticals/

Anatomy of a shrimp
http://blogs.sun.ac.za/ctscanner/2014/01/10/anatomy-of-a-shrimp/

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Welcome

Happy 2014 to all! This year starts off with an early newsletter, to remind everyone to plan for their CT projects. In this issue we demonstrate the capabilities of this technology with a wine bottle and a light bulb. Other new examples are a headache pill and a shrimp available on the website, enjoy and please send this newsletter on to your colleagues and friends.

Previous newsletters and many more examples can be found at **www.sun.ac.za/ctscanner**. Thank you for the support!

People & News

A new internship was granted by the NRF, which we are very grateful for. After a long selection process, the ideal candidate was identified and will be joining the team in April, watch this space. In the meantime we have been preparing the system for a busy 2014 and we are ready for your samples and your projects.

Getting the system ready for a busy 2014

Application of the month:
Wine volume measurement in situ

A microCT scanner is a precision dimensional measurement device, making it possible for example to measure the volume of wine inside a closed bottle of 1963 South African sweet wine (Port). The image to the right illustrates the bottle (semi-transparent), the lead neck cover (green), the wine (dark red) and the air in the neck of the bottle (blue), as well as a plastic seal / label (yellow). Interestingly, the wine is found to have a total volume of 735 cm^3, equivalent to 735 ml. The air volume between wine and cork was also measured as 16 cm^3, therefore the quoted specification of 750 ml is not accurate, in this case.

The aim of this proof of concept is to show how nondestructive volume measurements can be applied for quality inspections, and the method is not limited to wine bottles, it can work with any container which can be penetrated easily by X-rays (it can be opaque or even light metals). This kind of measurement can be useful for packaging or bottling companies as a quality check, or for buyers of expensive goods sold by volume.

More information at:

http://blogs.sun.ac.za/ctscanner/2014/01/10/wine-volume/

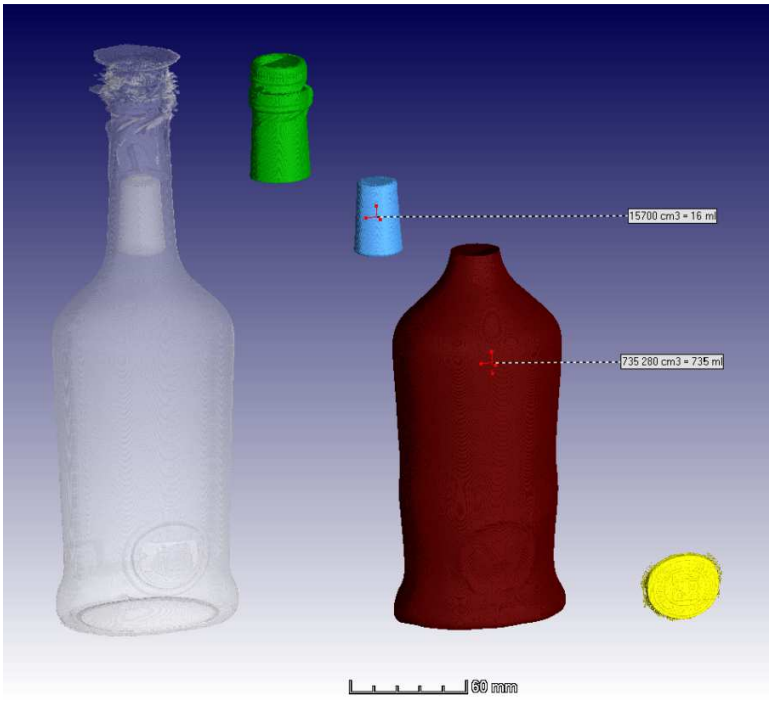


Figure 1: 1963 South African sweet wine CT Scan

Highlight: A Light Bulb

A simple example of the X-ray imaging capabilities of this technology is with a normal filament-type light bulb.

A digital X-ray image (obtained in a few minutes) is shown, providing useful information on the location of different materials and providing an inside view, though in 2D only. This type of imaging is a standard NDT methodology which we also offer.

However, our focus is on the full 3D information demonstrated with the same example in the next figure. Here, the different materials have been given different colours to highlight the differences and ability to distinguish them from one another, and a virtual cut displays the inner details in 3D.

See more images of this example and a nice animation at:

http://blogs.sun.ac.za/ctscanner/2014/01/10/light-bulb/

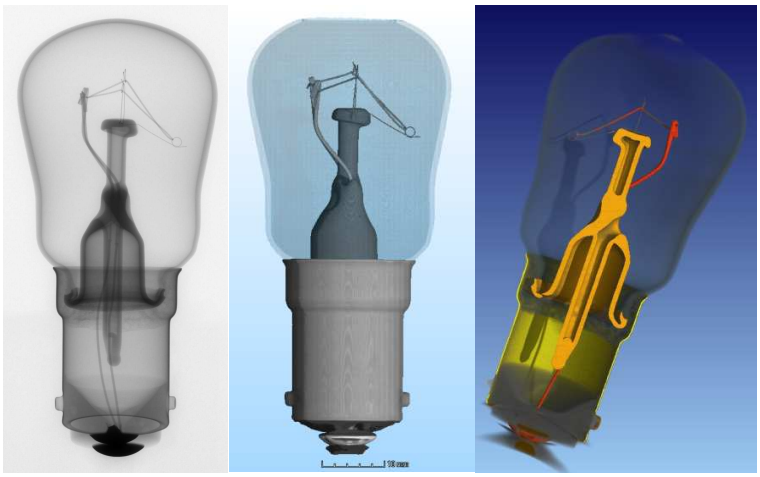


Figure 2: Imaging of a light bulb: (a) digital X-ray image, (b) CT surface view, (c) CT virtual cut in 3D in colour

Special offers

Student training workshop: the next training workshop is on 3 February and places are limited, book now !

This workshop covers all necessary X-ray and CT physics, X-ray safety, CT scan settings and metholodogies, CT experimental design and practical scanning demonstration, as well as basic analysis. **Cost: R1500 per student**

Test scan offer: Test scans for new users are done at R1000 for a simple scan. T&C: academic users, sample 5-100 mm diameter. Test scans for commercial and private clients R2000.

Please support our advertiser – see advertisement in the next pages – more information at
http://www.zeiss.com/xrm
Local contact / representative:
Veno.naidoo@zeiss.com

Zeiss X-ray microscopy workshop to be held on 30 January 2014, see below for invitation and more details.

Services & Events

Our pricelist and service offerings have been updated, some new features on the website are:

- Live booking calendar: instant online booking form, try it!
- Complete price list with many service types (hourly or per sample pricing)
- Object size – scan resolution graph

A Zeiss X-ray microscopy and mineralogic workshop will be held on 30 January in Johannesburg, see below for more information. Click here to register:
http://pages.microscopy.zeiss.com/SouthAfricaMineralogyWorkshopRegistration.html

Stellenbosch university students and local facility users are invited to submit abstracts for the first annual Student Symposium in Analytical Sciences, see more information at **http://blogs.sun.ac.za/caf**

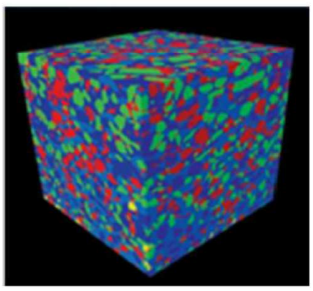
Acknowledgements

The CT scanner equipment acquisition was made possible with grants from the National Research Foundation and Stellenbosch University. The Department of Science and Technology Internship program is also acknowledged for its support of this facility. We encourage and welcome any form of sponsorship or support in order to keep delivering the best quality.

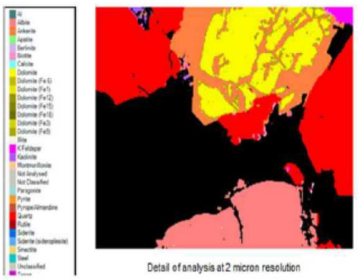
X-Ray Microscopy and Mineralogic Workshop

An Invitation

Carl Zeiss Pty (Ltd) would like to cordially invite you to participate in our upcoming workshop



Date: Thursday, 30 January 2014
Venue: Johannesburg - TBC
Time: 9am to 5pm
Group Dinner to follow at 5:30pm.



Detail of analysis at 2 micron resolution

Catering will be provided for the workshop.

Please RSVP Vani.naidoo@zeiss.com and register directly online by no later than 15 January 2014

ONLINE REGISTRATIONS:
http://pages.microscopy.zeiss.com/SouthAfricaMineralogyWorkshopRegistration.html