

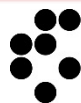


# Introduction to calculation of results and measurement uncertainty in radiometry

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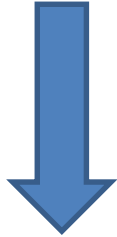


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# Calculation of results

- Raw data – spectrum or count rates



- Counting time
- Peak area or number of counts in peak
- Background count rate
- Procedure blank
- Energy calibrated detector
- Efficiency calibrated detector
- Data of other relevant measurements: mass, volume of the sample,...

# Calibration of instruments

- Qualitative determination – what?



- Energy calibration

- Quantitative determination – how much?



- Efficiency calibration

# Background

- Need to know background count rate



- Measure detector response in the absence of the sample
  
- Procedural blank measurement => apply the same analytical procedure but without the sample and measure

# Other data

- Amount of sample (volume or mass)
- Moisture content, if relevant
- Dry weight / wet weight correction, if relevant
- Decay corrections

# Measurement uncertainties

- Take into account all sources of uncertainties

- Radioactive decay follows Poisson distribution

- $u = \frac{N}{\sqrt{N}}$

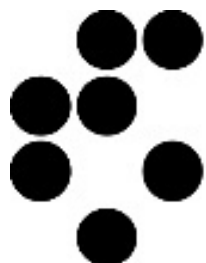
- Propagation of measurement uncertainty

- $a = b * c$  or  $a = \frac{b}{c}$   $u_{c,a} = a \sqrt{\left(\frac{u_b}{b}\right)^2 + \left(\frac{u_c}{c}\right)^2}$

- $a = b + c$  or  $a = b - c$   $u_{c,a} = \sqrt{(u_b)^2 + (u_c)^2}$

- $U = k u_{c,a}$   $k$  : coverage factor

# meet cinch



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