

## **Revised SI Poster Downloads**

On 20 May 2019 the International System of Units as we know it now with the International Prototype of the Kilogram (IPK) as the universal standard for mass, is replaced by the Revised SI where all units are defined in terms of constants that describe the natural world. In the revised SI four of the SI base units – namely the **kilogram**, the **ampere**, the **kelvin** and the **mole** – are redefined in terms of fixed numerical values of the Planck constant ( $h$ ), the elementary charge ( $e$ ), the Boltzmann constant ( $k$ ), and the Avogadro constant ( $N_A$ ), respectively. Further, the new definitions of all seven base units of the SI are also uniformly expressed using the **explicit-constant formulation**,

### ***The International System of Units, the SI, is the system of units in which***

- the unperturbed ground state hyperfine transition frequency of the caesium 133 atom  $\Delta\nu_{\text{Cs}}$  is 9 192 631 770 Hz,
- the speed of light in vacuum  $c$  is 299 792 458 m/s,
- the Planck constant  $h$  is  $6,626\ 070\ 15 \times 10^{-34}$  J s,
- the elementary charge  $e$  is  $1,602\ 176\ 634 \times 10^{-19}$  C,
- the Boltzmann constant  $k$  is  $1,380\ 649 \times 10^{-23}$  J/K,
- the Avogadro constant  $N_A$  is  $6,022\ 140\ 76 \times 10^{23}$  mol<sup>-1</sup>,
- the luminous efficacy of monochromatic radiation of frequency  $540 \times 10^{12}$  Hz, Kcd, is 683 lm/W, where the hertz, joule, coulomb, lumen, and watt, with unit symbols Hz, J, C, lm, and W, respectively, are related to the units second, metre, kilogram, ampere, kelvin, mole, and candela, with unit symbols s, m, kg, A, K, mol, and cd, respectively, according to  $\text{Hz} = \text{s}^{-1}$ ,  $\text{J} = \text{kg m}^2 \text{s}^{-2}$ ,  $\text{C} = \text{A s}$ ,  $\text{lm} = \text{cd m}^2 \text{m}^{-2} = \text{cd sr}$ , and  $\text{W} = \text{kg m}^2 \text{s}^{-3}$ .

For more information on the SI and its revision visit the link:

<https://www.bipm.org/en/measurement-units/rev-si/>. The 9<sup>th</sup> Edition of the SI brochure is available from: <https://www.bipm.org/en/publications/si-brochure/>.

The national metrology institute of South Africa (NMISA) together with one of its educational partners, the University of Cape Town under their MeASURE programme have developed educational posters to assist teachers and students. These are downloadable in separate links below. There are 4 posters, each optimised for A1 printing.