paths globally and *reusing* a partial path for all detector pairs allow us to significantly reduce the number of samples and consequently the computation time.
The scatter estimation is incorporated into a PET reconstruction algorithm where the scattered term is subtracted from the measurements. We also show that with this correction, the noise of the reconstructed data can be greatly reduced.

Modelling of the SET and RESET Process in Bipolar Resistive Oxide-Based Memory Using Monte Carlo Simulations

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A proper fundamental understanding of the switching mechanism in resistive random access memory (RRAM) is still missing, despite the fact that several physical mechanisms based on either electron or ion switching have been recently suggested in the literature.
We associate the resistive switching behavior in RRAM with the formation (Set) and rupture (Reset) of a conductive filament (CF). The CF is formed by localized oxygen vacancies (V_o) or domains of V_o. Formation and rupture of a CF is due to a redox reaction in the oxide layer under a voltage bias. The conduction is due to electron hopping between these V_o.
For modeling of the Set and Reset process in bipolar oxide-based memory by Monte Carlo techniques, we described the dynamics of oxygen ions (O^{2-}) and electrons in an oxide layer as follows: 1) an electron hops into V_o from an electrode; 2) an electron hops from V_o to an electrode; 3) an electron hops between two V_o; 4) formation of a V_o by O^{2-} moving to an interstitial position; 5) anyhilation of a V_o by moving O^{2-} to the V_o; 6) movement of O^{2-} between the interstitials.
To verify the proposed model, we first evaluate the average electron occupations of hopping sites under different conditions. For comparison with previous work all calculations are performed on a one-dimension lattice consisting of thirty equivalent, equidistantly positioned hopping sites. The distribution of electron occupation probabilities calculated with our approach is in excellent agreement with previous work.
To simulate thermostability of a CF, we calculated the dependence of the electron occupation distribution near the anode and cathode for a system with different conditions and without taking into account the ion motion. In all types of systems the change is marginal amounting to less than 10% for a temperature increase from 25^oC to 200^oC. The proposed model contributes to for better understanding the resistive switching phenomena and it can be used for performance optimization of RRAM devices.