

Asymmetric encryption for integrity

Alice encrypts a message m with her private key K_{s_A}

➔ Everybody can decrypt m using Alice's public key K_{p_A}

✓ Authentication with non-repudiation (a.k.a Digital Signature)







KSAs, KPA

KpA

KpA

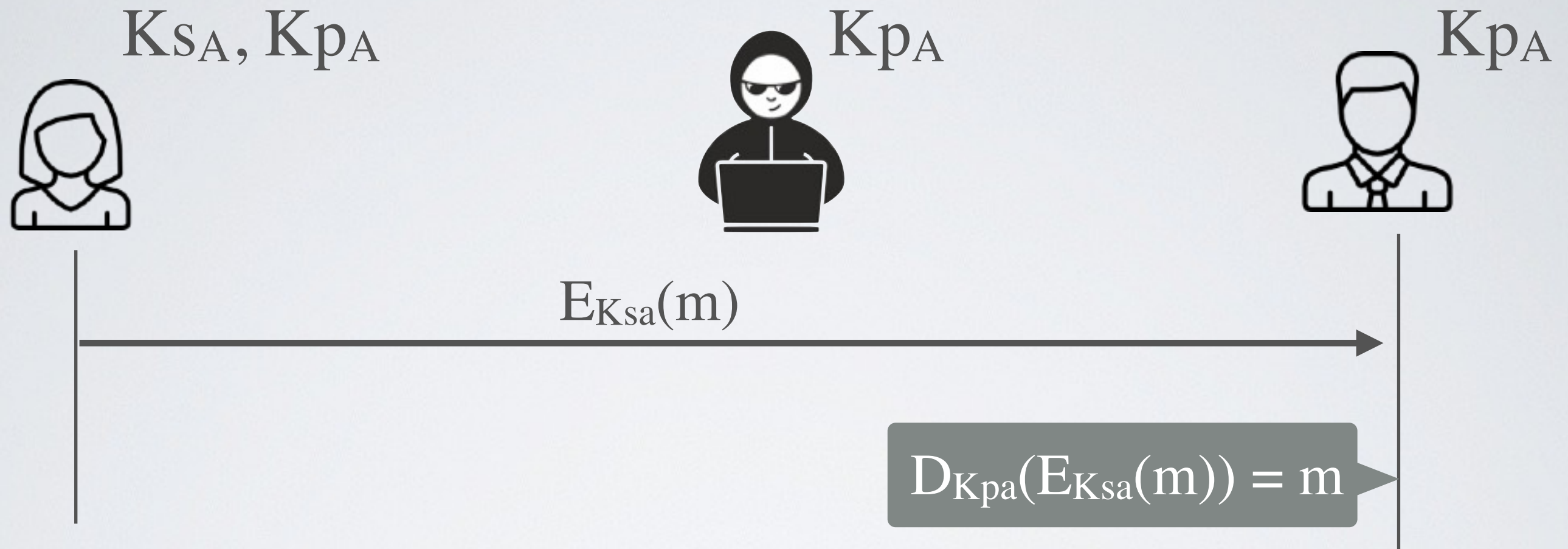





$$E_{Ksa}(n)$$

$$D_{Kpa}(E_{Ksa}(m)) = m$$

Asymmetric encryption for **integrity**



Alice encrypts a message m with her private key K_{SA}

➔ Everybody can decrypt m using Alice's public key K_{PA}

✓ Authentication with non-repudiation (a.k.a Digital Signature)

Functional Requirements

$D_{K_s}(E_{K_p}(m)) = m$ and $D_{K_p}(E_{K_s}(m)) = m$ for every pair (K_p, K_s)

- ✓ Generating a pair (K_p, K_s) is easy to compute (polynomial)
- ✓ Encryption is easy to compute (either polynomial or linear)
- ✓ Decryption is easy to compute (either polynomial or linear)
- Finding a matching key K_s for a given K_p is hard (exponential)
- Decryption without knowing the corresponding key is hard (exponential)